MARCH 5, 1951

STEEL

The Weekly Magazine of Metalworking

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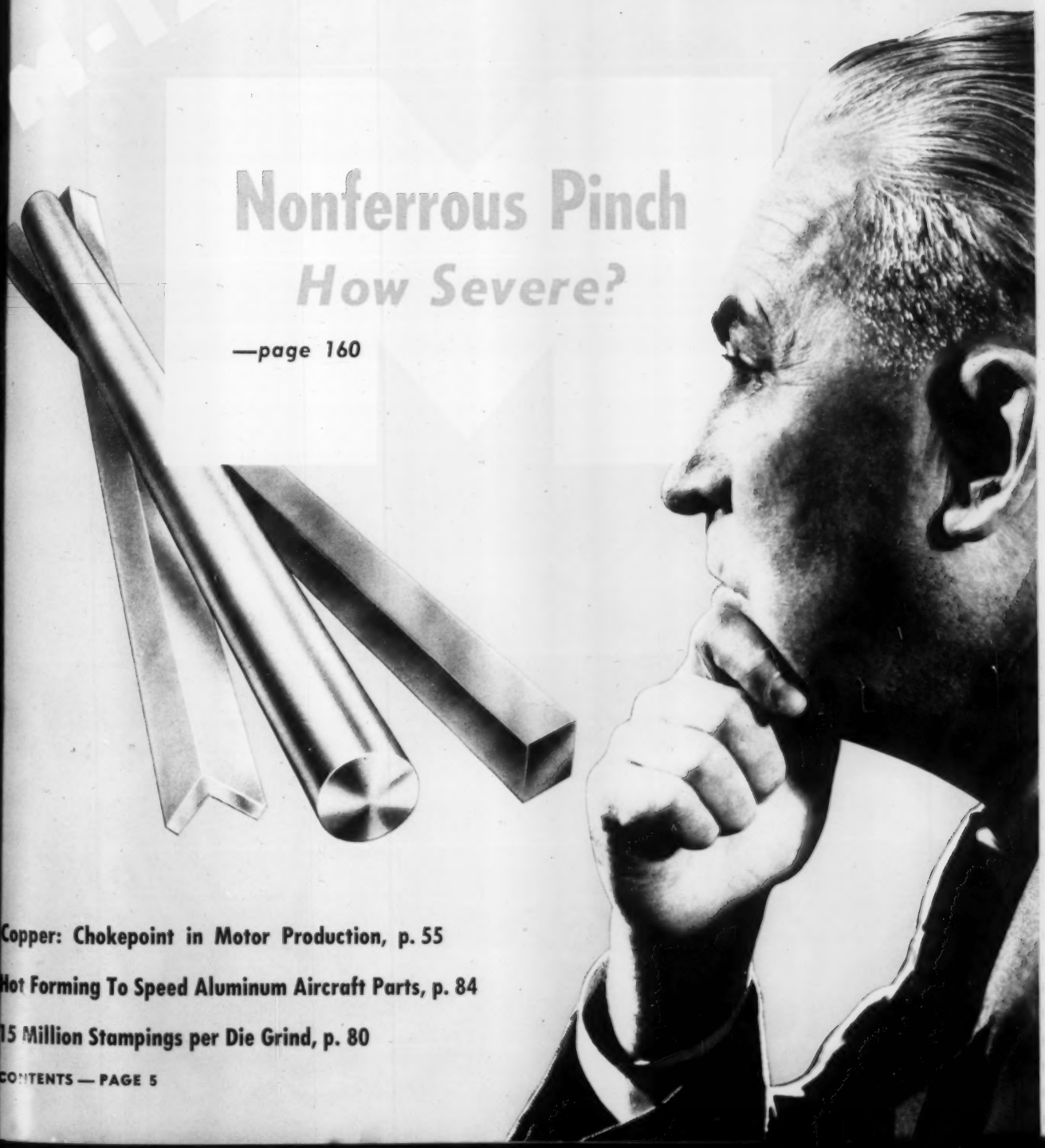
Nonferrous Pinch
How Severe?

—page 160



Copper: Chokepoint in Motor Production, p. 55

Hot Forming To Speed Aluminum Aircraft Parts, p. 84

15 Million Stampings per Die Grind, p. 80

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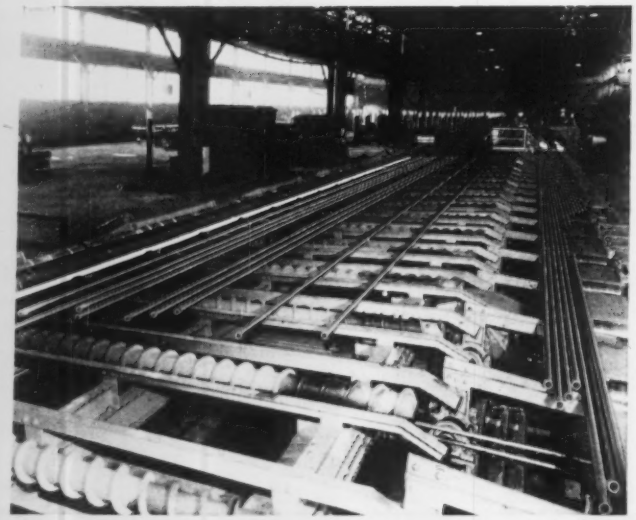
NATIONAL TUBE'S new continuous "Stretch-Reducing" SEAMLESS PIPE MILLS

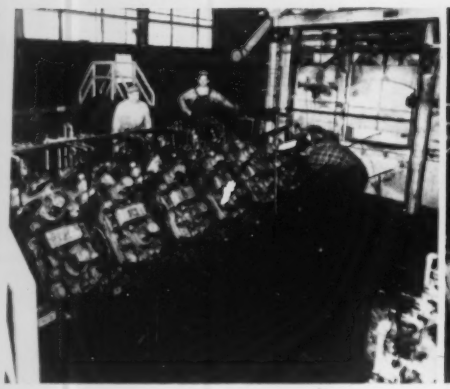
designed and built by Aetna-Standard

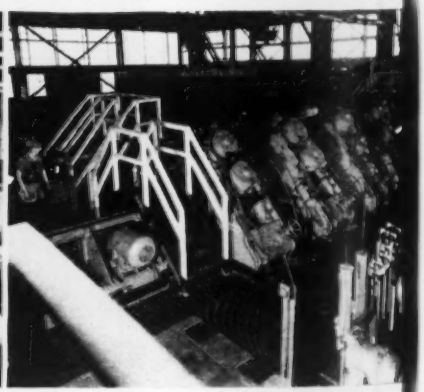


National Tube and Aetna-Standard specialists have been working together for several years in the development of the world's first continuous seamless pipe mill now in operation at Lorain. A similar mill has been installed at Gary. These mills, based on the stretch-reducing principle, have been hailed as "one of the greatest advances in the steel industry during the past 50 years."

Aetna-Standard has been proud to work with National Tube in this accomplishment. This company builds most of the seamless tube mills in the world for pipe sizes from 2½" to 26".

DESIGNERS AND BUILDERS to the Steel, Nonferrous and Chemical industries





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YOUNGSTOWN, OHIO

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STEEL
The Weekly Magazine of Metalworking

VOL. 128 NO. 10 MARCH 5, 1951

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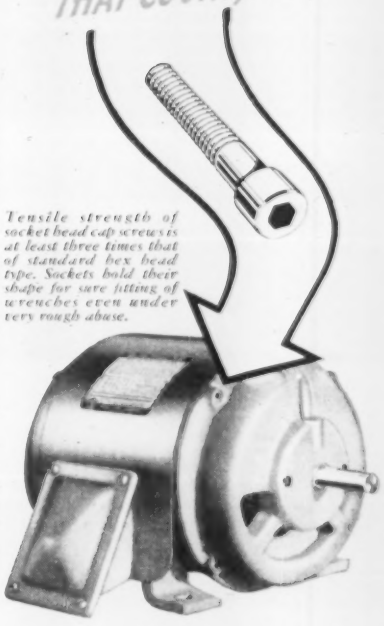
Editorial and Business Staff—Page 10. Advertising Index—Page 182. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week . . . **Getting the Most Out of Machines and Tools . . . Copper Tubes Spot Annealed in Deoxidizing Atmosphere . . . Hot Paint Spraying Saves Finishing Materials, Labor . . . Krupp-Renn Process Used for Iron Ore Beneficiation**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

In making a better motor...

IT'S THE LITTLE THINGS THAT COUNT, too!



Tensile strength of socket head cap screws is at least three times that of standard hex head type. Sockets hold their shape for sure fitting of wrenches even under very rough abuse.

All RELIANCE MOTORS are *Precision-Built* down to the last detail!

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New, Improved

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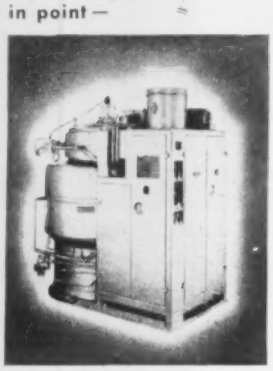
✓ Production Line Proved

for metal products requiring a protective coating with resistance to extreme high heat.

✓ Withstands 1000° (F.)

without blistering or peeling

The Vapor Clarckson Steam Generating Unit is a case in point—



☆ This unit has inside temperatures of up to 3,000° (F.) and develops full capacity in two minutes to deliver 1,000,000 b.t.u. A rugged finish is necessary to protect it not only against heat, but also against the corrosive and deteriorating influences of dirt, grime, oil, and climatic elements. SICON Aluminum is used because it answers these exacting requirements. Due to its quick-drying it can be handled minutes after application. Write today for *latest tech data* describing many other SICON applications.

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Behind the Scenes . .

Professor Shrdlu Gives a Quiz

Want to test your industrial I. Q.? Listed below are ten questions dealing with recent developments in the industry and the national defense program — all covered, incidentally, in the Feb. 19 and Feb. 26 issues of STEEL. Jot down your answers on a post card and send it in. Any grade of 90 or better wins our honorary B.T.S. degree, complete with sheepskin. First in with a perfect score also wins a grand prize stolen (?) from Senator Taft and suitably inscribed. No cribbing allowed.

1. Top labor adviser to Defense Boss Charles E. Wilson is:
   a. Walter Reuther
   b. Dr. Arthur S. Flemming
   c. Maurice Tobin

2. M-37 is an NPA order dealing with:
   a. Zinc scrap
   b. Industrial construction
   c. Paper

3. A "convertiplane" is a:
   a. Machine tool
   b. Plane which can be converted from a bomber to a transport
   c. Plane which can take off like a helicopter but fly forward like a conventional ship

4. The iron and steel industry poured ——— tons of ingots in January for an alltime high.
   a. 8,830,000
   b. 8,380,000
   c. 3,880,000

5. Tin cans, steel barrels and manufacturing equipment resist corrosion from food and chemicals when coated with finishes containing a chemical called R-108 by:
   a. E. I. duPont de Nemours & Co.
   b. Chandler Chemical Co.
   c. General Electric Co.

6. DO Code No. 03 is a Defense Department priority number and is used for:
   a. Fuels, lubricants
   b. Ships
   c. Miscellaneous

7. Womanpower adviser to the Department of Labor is:
   a. Cornelia Otis Skinner
   b. Helen Gahagan Douglas
   c. Mary Norton

8. Newly designed chalkboards in a restful shade of green can be made of:
   a. Porcelain-enameled steel
   b. Specially prepared copper plate
   c. Aluminum sheet

9. A big tank builder expects to need ——— subcontractors.
   a. 9402
   b. 3000
   c. 4000

10. STEEL's national ingot operating rate for the week ended Feb. 24 was:
   a. 99.4
   b. 99.5
   c. 99.6

Trapped

The other day we found ourselves in a situation that had previously been merely the theme of nightmares. We went into an excellent restaurant, gasped at the prices, but courageously decided to dine there anyway. When we had finished our meal, we gasped even more at the size of the bill, particularly since we didn't have enough money in our pocket to cover it.

Acutely embarrassed, we went to the manager and explained our predicament. Either from tact or many similar experiences, he showed not the slightest surprise and said a check would do. When we admitted we had no blank check with us, he took us to a desk in the foyer of the restaurant and there were blank checks from every major bank in the city.

We conclude that in these inflationary days more than one person has found himself in our position.

Puzzle Corner

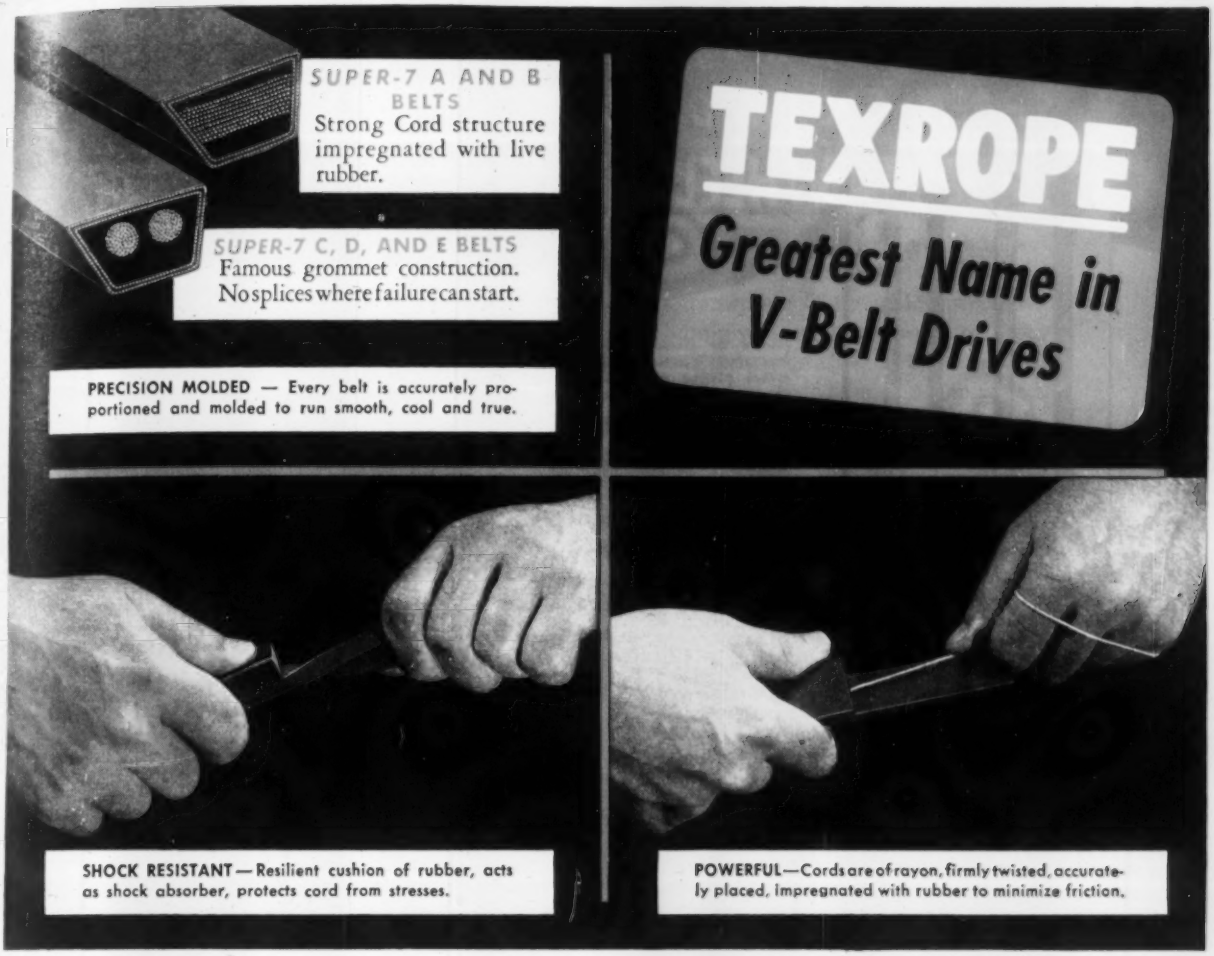
H. C. Osborne of Webster Electric Co. and R. W. Huff of Canton, O., came through with the answer to the Feb. 12 puzzle about army officers. Here they are: Brigadier Grenade, Colonel Verylight, Major Tank, Captain Mustardgas and Lieutenant Howitzer.

Huff, Stanley D. Koch Jr. of Emergency Steel Service and T. S. Bean of Barber & Ross Co. report correctly on the Feb. 19 problem: 30 cows could feed on 180 acres for 15 weeks.

A man sees the weight of a pile driver strike a pile every five seconds. If he is 220 feet from the pile driver, and if sound travels at the rate of 1100 feet per second, what interval elapses between two successive sounds as the man hears them?

Shrdlu

(Metalworking Outlook—page 43)


SUPER-7 A AND B BELTS
Strong Cord structure impregnated with live rubber.
SUPER-7 C, D, AND E BELTS
Famous grommet construction. No splices where failure can start.
PRECISION MOLDED — Every belt is accurately proportioned and molded to run smooth, cool and true.
TEXROPE
Greatest Name in V-Belt Drives
SHOCK RESISTANT — Resilient cushion of rubber, acts as shock absorber, protects cord from stresses.
POWERFUL — Cords are of rayon, firmly twisted, accurately placed, impregnated with rubber to minimize friction.

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Where space is limited or other special conditions demand heavier duty, the high capacity belt can be furnished in A, B, C, D, and E sections . . . Extra strong cords, special rubber cushion and tough Neoprene cover give them 40% greater capacity than standard belts at proportionately higher price.

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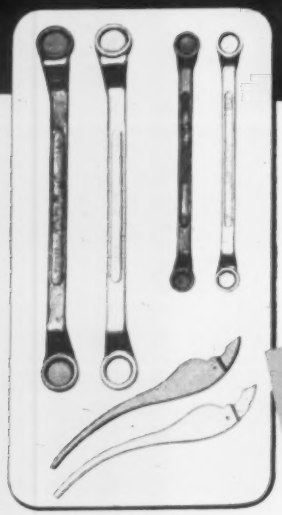

Notice the gleaming finish of the forgings after Wheelabrating. Wheelabrator makes plating easier, faster, better, by cleaning forgings down to virgin metal.

Wheelabrator Tumblast slashes costs 70%, cleaning tool forgings at LECTROLITE CORPORATION BEFIANCE, OHIO Pays for itself in two years

In thousands of installations, the Wheelabrator method of airless blast cleaning has proved itself to be a profitable investment. At the Lectrolite Corporation, for example, a Wheelabrator tumblast slashed the costs of cleaning tool forgings 65 to 70%. It replaced two blast barrels and a tumbling mill and produced twice as many forgings in less than one-half the time. Forgings are cleaner, making chromium plating easier and more durable without the necessity of subsequent surface treatment. Investigate the cost cutting performance, high-speed production and bonus benefits of the Wheelabrator. Write for the new catalog described below.

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FORMER METHOD	WHEELABRATOR METHOD
EQUIPMENT 2 Blast Barrels 1 Tumbling Mill	EQUIPMENT 36" x 42" Wheelabrator Tumblast (11½ cu. ft. capacity)
PRODUCTION 9 to 10 tons in 16 hrs.	PRODUCTION 14 to 15 tons in 8 hrs.
LABOR 32 man hours	LABOR 16 man hours

SAVINGS

Cost figures prove that Wheelabrator cut costs 65 to 75%. Repays investment in two years.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

LETTERS TO THE EDITORS

Re: STEEL's Checklist

What issues of STEEL contain rules governing (1) DO ratings: (2) NPA restrictions regulating commercial construction?

J. H. Tyn
Lederle & Co., Philadelphia

• *See Checklist on Controls, STEEL, Jan. 8, p. 30, for abstracts of both NPA Reg. 2 outlining DO ratings, and NPA Order M-4 governing commercial construction. Amendments to M-4 appear in the Checklist Jan. 22, p. 49 and Feb. 19, p. 41.*

Send More Price Charts

Please send STEEL's "Price & Production Chart," prepared for meeting of the Institute of Scrap Iron & Steel.

Earl A. Johnson
Kimball Brothers Co., Council Bluffs, Iowa

Send Institute of Scrap Iron & Steel "Price & Production Chart," noted in STEEL, Feb. 5, p. 6.

J. E. Coleman, Purchasing Agent
Pittsburgh Group Companies
Columbia Gas System, Pittsburgh

• *Copies forwarded.*

Watertight

What firms manufacture equipment for galvanizing small eaves trough accessories such as mitres and conductor pipe elbows?

J. D. Tennison Jr.
Tennison Brothers Inc., Memphis, Tenn.

• *Address inquiry to Wean Engineering Co. Inc., Warren, O. and Aetna-Standard Engineering Co., Youngstown.*

They're Doing It!

Can United States steel companies expand production 20 per cent?

Lawrence Klaus
Michigan State College, East Lansing, Mich.

• *Steel companies will be operating at least 118.7 million tons capacity by end of 1952. This compares with 99.4 million tons at beginning of 1950.*

Outdated

Some years ago you published a series on "Calculations of the Rolling Forces in the Hot Rolling of Steel." Can you still supply reprints?

Edward J. Ligler
Acme Steel Co., Chicago

• *This series, by Svend Edkelund, was published in STEEL Aug. 21—Oct. 2, 1933, and is no longer available except in photostat copies. However, you may be interested in a series of articles by J. D. Keller, Associated Engineers, Pittsburgh, "Cold Rolling Strip—an Appraisal of Today's Theory and Practice," which began in STEEL Feb. 19, p. 76.*

The Metalworking Outlook

Labor Tries a Coup

Labor is making a grandstand play to regain political ground it has lost since 1948. That's the basic reason for its withdrawal from the defense set-up in Washington, although dissatisfaction with the wage formula is the immediate factor which precipitated the showdown. Abject administration submission to labor demands would probably mean the resignation of Defense Boss C. E. Wilson and other key men in the defense organization. Refusal to give in to any union points will likely lead to disastrous work stoppages. Most probable outcome: A compromise somewhere between those extremes.

Price Controls Wobble

Labor is counting on public sympathy in the battle and will hammer away at the ineffective price controls to win support. Its argument is: Wage controls are unfair when food prices are virtually free. The new marginal arrangement for retailers, which promises higher prices, is more ammunition for its guns.

Washington Mood Changes

Watch for other liberalized control measures from Washington in addition to the relaxed price controls. Another is the fishing license permission just given nearly anyone to use DOs for maintenance, repair and operation supplies (p. 51). One reason: The administration thinks the worst is over in Korea. Defense buying will still be big, but a little of the pressure is off.

Expansions May Lower Curbs

By 1953 controls on steel and aluminum should be freed by production expansions. So says Frank R. Creedon, assistant administrator of NPA. A couple of weeks ago ESA Administrator Eric Johnston said much the same thing. They both think an annual steel production rate of 104.2 million tons now, boosted to 118 million tons by 1953 and an aluminum output rate of 761,530 tons now, boosted to 1.3 million tons should turn the trick, barring all-out war.

No Mobilization Letup

Expect no slackening in metalworking's mobilization efforts now. Westinghouse expects that military needs will take more than 35 per cent of its 1951 production. Diversion of critical materials to defense requirements is cutting production of consumer products in this quarter to some 20 per cent below the same period last year. Westinghouse is making no across-the-board cut. During the first seven months of the 1951 fiscal year, the Department of Defense obligated $16.4 billion for major equipment, supplies, military construction and expansion of production facilities.

Warehouse Changes Likely

Look for an amendment to M-6, the NPA order granting steel to warehouses. Under consideration is a regulation which, if

Production-Engineering News—p. 79 *The Market Outlook*—p. 151

adopted, would set a ceiling on the amount of DO-rated steel that warehouses could get over and above their tonnage quotas. Now, there's no limit to the extendability of DO ratings by warehouses. Effect of the proposed amendment would be to force warehouses to dip into their regular stocks to fill at least part of their DO business.

Pig Iron Allocations: Not Yet

Don't count on any merchant pig iron allocation program for the time being. Merchant pig iron producers have about convinced Washington that none is needed yet. Even some foundry users of the material don't want allocations, although they're having troubles getting it. They fear that controls would just complicate matters.

U.S. Tries Telefoto Service

NPA and ESA are studying a procedure for making the full text of all orders and releases instantly available to businessmen all over the country upon issuance. Indications are that this service will be made available through Telefoto machines of International News Service. The initial service may be set up for Chicago and San Francisco. Arrangements for other principal centers would follow.

Signs of the Times

An undisclosed site in Alabama is being considered for a huge H-bomb plant . . . Hoeganaes Sponge Iron & Metal Powder Corp., affiliated with a Swedish firm, will build a $4 million plant on the Delaware river near Riverton, N. J., to reduce iron ore into metal powder and then fabricate bearings, wheels and other products from the powder . . . Farm machinery makers are swamping NPA with requests for help; they think output will be cut 40 per cent in the second half because of materials scarcities.

What Industry Is Doing

General Services Administration will soon start ordering machine tools in a new order pool plan (p. 51) . . . Industry and government have agreed to standardize, catalog and lend aircraft die designs (p. 52) . . . Aluminum window makers face complete collapse of their business as a result of NPA orders (p. 53) . . . Electric motor deliveries are a year off in some cases as copper curbs force cutbacks (p. 55) . . . Rules governing industrial advertising expenditures are essentially the same as they were during World War II (p. 58) . . . Industry is spending $400 million a year to combat air pollution (p. 63) . . . The nickel pickle, with orders and counter-orders from Washington, has Detroit auto and plating men in a stew (p. 65) . . . STEEL's production index is at 223, an alltime high (p. 69).

Twice in a Generation

Circumstances surrounding ratification of the last two amendments to the Constitution of the United States afford a sound lesson for all thoughtful Americans. Adoption of the twenty-first and twenty-second amendments is clearly belated correction by a sober-minded public of mistakes it made in periods of emotionalism.

Consider prohibition. The eighteenth amendment—forbidding manufacture, sale and transportation of intoxicating liquors—passed the House by a 282 to 128 vote and the Senate by 65 to 20. The public and Congress, preoccupied with problems of reconstruction after World War I, were suckers for a fanatical minority which thought law could do what only education can do. The result was an outburst of gangsterism, lawlessness and moral disintegration, the harmful effects of which still plague us today. No wonder the people changed their minds. In 1933 Congress repealed prohibition by virtually the same majority it embraced the "noble experiment" 13 years previously.

Franklin D. Roosevelt was elected by impressive majorities in 1932 and 1936. As the election of 1940 approached, many persons questioned the advisability of breaking the tradition that a president should not serve more than two terms. By that time, the political appeal of certain aspects of the "new deal" had cloaked Mr. Roosevelt with an aura of indispensability. Mob emotionalism drowned out the voice of caution.

At the time, this was hailed as a great victory over old-fogyism. Fortunately history deals in broader perspective. The victory which tasted so sweet in 1940 now is dimmed by the tragic aftermath. Had we stuck to our tradition, we might have been spared millions of lives, billions of dollars and perpetual threat of violence by barbarians. No wonder, then, that last week the people corrected their mistake of 1940 by ratifying the twenty-second amendment.

That false prophets have beguiled the American people so badly twice in a single generation should shock us into a resolve not to let it happen again. We should listen to the voices of caution whenever a glamorous pied piper tries to lead us away from principles we have found to be sound.

E. L. Shaner

EDITOR-IN-CHIEF

UNIONS TOO IMPATIENT: In withdrawing its members from all jobs in the defense mobilization organization and in issuing a highly critical statement of government wage and price policies the united labor policy committee of the major labor unions chose a dramatic and perhaps an unprecedented method to draw national attention to its grievances.

In many quarters, the unions' complaint about prices will register as valid. As a matter of fact, there is widespread doubt about price regulation throughout all segments of society. How-

AS THE EDITOR VIEWS THE NEWS

ever, few people will agree that wages are being "frozen" unfairly. General opinion would be that to date the government has left considerable leeway for both wages and prices to advance.

The unions have been a little too impetuous. If all of us were to pick up our marbles and go home when something happened which we didn't like, the mobilization effort would fail. At this early stage, everybody ought to be willing to exercise a little patience. —p. 43

ACCENT ON RESEARCH: Industrial research figures prominently in the week's news. The National Academy of Sciences and the National Research Council are organizing a group of eminent metallurgists to advise the Research & Development Board of the Department of Defense on research aspects of some of the nation's critical metals problems. Included in the roster of advisers are many of the top-flight metallurgists in the metalworking industries. Concurrently, United States Steel Corp. is forming a research policy committee to intensify research in the corporation's subsidiaries.

These two developments are typical of the increased emphasis that is being placed upon research under today's unusual conditions. Thousands of corporations and hundreds of universities and endowed foundations are expanding their research activities substantially to meet the challenge of mobilization. This is real progress in a field that has tremendous possibilities for helping us to win peace through strength.

—pp. 54, 55

IDEAL EXCHANGE, BUT . . : In the news this week is a report that West German companies, mainly in Dusseldorf, have contracted to buy 1.4 to 1.5 million tons of coal from the United States and to ship to this country 200,000 to 250,000 tons of rolled steel products in exchange.

This seems to be an ideal arrangement. We have a great abundance of coal and an acute shortage of steel. Coal is the limiting factor in steel production in the Ruhr. The deal ought to be beneficial for all parties. Nevertheless, it will be well to judge on the basis of final results. We can picture scores of bureaucrats scattered from Bonn to Washington feverishly trying to find technical flaws in this simple exchange. There are millions of people on public payrolls throughout the world who think their mission in life is to discover why something good "cannot be done." —p. 61

NEW POSTWAR RECORD: This publication's index of industrial production—based upon steel ingot operations, electric power output, freight car loadings and automobile assemblies—hit a new postwar high in the week ended Feb. 24. It registered 223 per cent of the 1936-1939 average against the highest previous postwar level of 222 per cent last October.

This new record was achieved under unusual circumstances. Electric power output is down seasonally owing to the days of longer daylight. Revenue freight car loadings have not fully recovered from disturbances of the last several weeks. Steel ingot output, while up from the previous week, has not rebounded to the better than 2 million tons a week recorded before the switchmen's strike.

With these three factors lagging, it remained for automobile assemblies to contribute most potently to the new record. Output in the week was 192,243 units, the highest since the week of last July 15. Barring strikes, most thermometers of production are likely to establish new postwar highs almost weekly. —pp. 69, 70

WHERE THE SLAG GOES: H. T. Williams of Standard Slag Co. gave members of the Eastern States Blast Furnace and Coke Oven Association illuminating figures on the production and consumption of blast furnace slag. In 1949 output of slag from the nation's stacks totaled 30 million net tons, of which 70 per cent found its way into commercial use. Largest market was foundation for highways, which took 34 per cent of production. Next market in order of volume was the railroad industry, which used 20 per cent of total production for roadbed ballast. More than half of the mineral wool being marketed today is made from blast furnace slag. A problem of the industry is that the bulk of the tonnage is shipped during six months of the year, necessitating the building up of large stockpiles during the winter months.

—p. 105

Industry's reaction is varied as . . .

NPA Gives Carte Blanche on MRO

The federal agency permits virtually all enterprises to issue their own DO priorities to get maintenance, repair and operation supplies

"SHEER window dressing. . .A great boon to industry. . .It'll help now, but it will make the whole priorities program meaningless eventually."

Those were the varied reactions to National Production Authority's Regulation 4 issued Feb. 27. It permits all establishments in the U. S.—warehouses, factories, retail and wholesale stores, service shops, farms, hospitals, schools, libraries, churches, federal, state and local government agencies—to use a priority rating to procure equipment and supplies to maintain, repair and operate present facilities.

Far-reaching—In one of the broadest orders yet issued, NPA permits you to extend a DO order immediately (DO-97) to get supplies needed to operate your plant, without obtaining permission from Washington first. You can't issue priority ratings in any quarter in excess of its average quarterly dollar purchases for such supplies in 1950 or the fiscal year ending nearest to Dec. 31, 1950. If that quota is too small, NPA can be petitioned for an adjustment. If less than $1000 a quarter was spent on MRO supplies in 1950, forget about quota restrictions.

You don't have to use the new priority rating to get MRO supplies. If you wish, you can continue to order supplies as you think you can get them. But if you do use a DO-97 for some supplies during a calendar quarter you will have to stick to NPA provisions in Regulation 4 for all of your other MRO needs that quarter.

Two-Way Help—The edict may aid in two ways: By assisting in getting MRO supplies for your own plant; by giving you a DO to get more materials when part or all of your business is as an MRO supplier. That latter angle is especially pleasing to such companies as materials handling equipment manufacturers who are having trouble obtaining materials for their regular replacement parts business. Few medium or large metalworking companies that have little or no replacement business are excited about the regulation because thus far they have had no serious trouble finding MRO supplies on their own. But it will bail out many small companies hampered by a lack of operational materials.

Lukewarm about the edict are most foundries, automotive suppliers, screw machine product manufacturers and others who normally make components for the original equipment market or for the replacement trade that is not eligible for DO help.

Doubts — Many manufacturers—both in the groups that like or are indifferent about the regulation—have their doubts about the long-term good the NPA action will do. "It's too broad," they say. "It will help for a while, but eventually we'll end up with inflated priorities that will become progressively less helpful as everybody and his brother issues the DO. In a few months we'll end up exactly as we are now."

At least one trade association is so doubtful about the benefits that it will advise its members not to use DO-97. "The thing will soon degenerate into a mere fishing license," it believes, "and will only annoy the supplier on whom it is served."

Tool Pool Starts

General Services Administration, on NPA instructions, will soon start ordering machine tools

THE POOL order system for machine tools is being inaugurated, by authority of the NPA orders M-40 and M-41.

General Services Administration, on instructions from NPA, will soon begin to place orders for tools it believes private firms will need to fill defense orders that have yet to be placed. Each pool order will carry a certificate authorizing the producer to apply a DO rating to obtain materials needed in the manufacture of the machine.

Parallel—The plan, similar to one put into effect early in World War II, is aimed at making machine tools available immediately when a company receives a defense order. Otherwise the company would have to wait until it received a contract before ordering the necessary machine tools. The tools in the order pool will be available only to companies filling military contracts.

GSA will estimate machine tool requirements for the defense program on the basis of plans of the Defense Department. By the time the Defense Department actually awards its contracts, GSA already will have ordered the machines needed to fill the contracts. The government would be stuck with any miscalculations in ordering too many of any one type of machine.

Strictly for Defense — NPA says that 70 per cent of the country's machine tool production is to be made available for filling military contracts. Part of that 70 per cent would be purchased by GSA, the rest by private firms which already have DO orders. M-40 sets up the system under which GSA places tool orders. M-41 sets up a system for regulating the delivery of those tools from GSA to private users.

Machine tool makers who have too many orders to fill in time to meet commitments are required beginning July 1 to rearrange their delivery schedules this way: Each month up to 70 per cent of the production of

each size machine tool shall be delivered to the various armed forces branches on their contracts if their orders call for delivery in that month. The remaining 30 per cent may be delivered to all other purchasers with rated and non-rated orders.

Among the types of machine tools that GSA may soon begin buying are: Balancing, boring, buffing, filing, measuring, testing, milling, polishing, riveting, sawing, welding and shearing machines and hammers, lathes, planers and slotters.

Used Tool Price Curbs Hit

"Realistic" price ceilings are needed soon on used machine tools, says Charles A. Simmons Sr., president of Simmons Machine Tool Corp., Albany, N. Y.

Mr. Simmons advises Economic Stabilization Agency that ceilings on used machine tools should reflect the difference between "as is" machines and "rebuilt" units. Ceilings can be based on a modernized version of OPA Price Regulation No. 1 on machine tools.

Ceiling prices, according to Mr. Simmons, should be adjusted to the age of the tool, as more work is required in rebuilding older machines. A workable ceiling formula should define price, what rebuilding is and what extras may or may not be included in the ceiling price.

He says that the volume of machine tool rebuilding business, practically nonexistent three months ago, has shot up to near capacity today.

Carboloy To Build In Detroit

Rapidly increasing demand for tungsten carbides in various forms is causing a $2.8 million expansion program by Carboloy Co., Detroit. Nearly $1 million will be spent to expand the present Detroit plants, while the rest will be used for construction and equipping a new plant in Edmore, Mich. With completion of the expansion, 50 per cent of Carboloy's carbide metal output will be directly under government contract. The other 50 per cent will be indirectly for defense—in the form of cemented carbide tools and dies for industry.

Cincinnati Lathe Firm Bought

Cincinnati's 52-year old lathe manufacturing firm, the Nebel Machine Tool Co., has been purchased by Charles Wm. Doepke and Frederick W. Doepke, Cincinnati businessmen. The Nebel name will be continued and there will be no change in personnel.

Cross Adds Machine Tool Plant

A new plant has been built in Detroit by the Cross Co., that city, for expanding manufacture of special machine tools under government order. The plant will produce small machine parts. New equipment has also been added at the company's main plant, including a large Pratt & Whitney jig-borer capable of measuring within an accuracy of millionths of an inch.

New Chief for Plate Section

Max Hoffmann, United States Steel Co., is new chief of the NPA Iron & Steel Division plate section. He succeeds W. E. Mullerstein and William E. Bossert who have rejoined their companies, Lukens Steel and Alan Wood Steel, respectively.

He'll Seek More Suppliers

Don G. Mitchell, president, Sylvania Electric Products Inc., New York, is special consultant to Air Force Undersecretary John McCone to assist in procurement of electrical equipment and components and in obtaining more suppliers for such equipment.

Less Steel for Freight Cars

NPA will give less steel to freight car builders in May, a tacit admission that the industry has been getting too much thus far.

We still have a freight car shortage and need 10,000 new cars a month, but the builders have been unable to reach anything like that production level yet. Nevertheless, they are being allocated 310,000 tons a month for the first four months of 1951. That's enough to build 10,000 cars. The builders will get only 288,500 tons of steel products in May, enough for 9000 cars.

The nation's freight car fleet is more than 30,000 cars smaller than it was a year ago because so many cars have had to be retired. Roads now are retiring about 5000 cars every month.

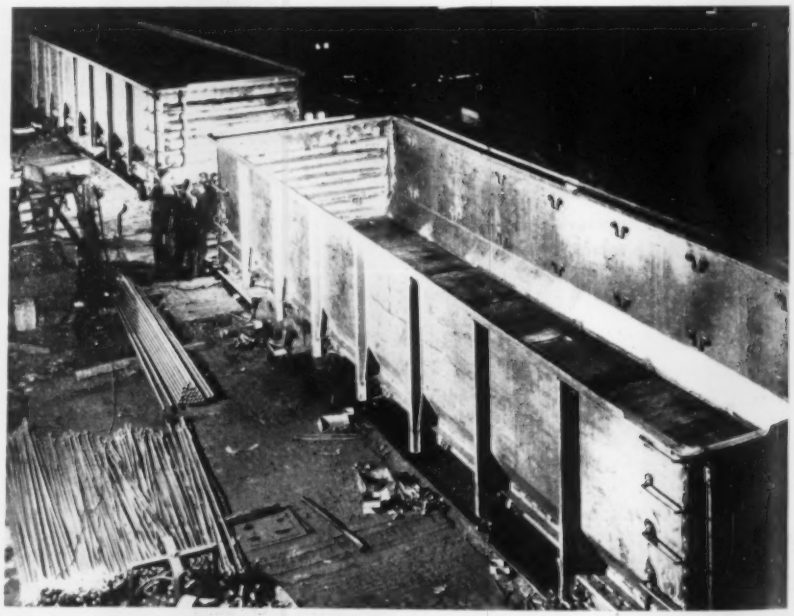
Extrusion Dies Pooled

Industry and government agree to standardize, catalog and lend aircraft die designs

THE AIR Materiel Command has come up with a plan to smooth the flow of aluminum and magnesium aircraft extrusions: Catalog standard shapes and pool extrusion dies. All aircraft manufacturers and extrusion producers whose products are used by the government are participating in the interchangeability agreement. Covered are extruded aluminum and magnesium structural shapes, special sections and tubing.

The pooling program calls for each participating aircraft builder to make available his dies to any other manufacturer or government agency needing that particular shape. This will enable extrusion manufacturers to use any specified die to produce a particular extrusion for any aircraft company's requirements.

Stardardization—The catalog will be used by participating planebuilders



NPA WILL GIVE LESS STEEL TO FREIGHT CAR BUILDERS IN MAY
. . . 288,500 tons—enough for 9000 cars

TWO IN ONE: Side by side in Dravo Corp.'s shipyard on Neville Island, Pittsburgh, are two units of an integrated fleet designed and built for Texas Barge Line Inc., Houston. The welded steel vessels can be butted together in a tow to form an unbroken hull line 580 feet long. Total capacity of the barges is 51,000 barrels of oil or other petroleum products

and government agencies as a central source of data. Aim of the project is to avoid duplication of facilities and to simplify supply and production operations.

Joint sponsors of the program are the Air Force, the Navy's Bureau of Aeronautics and the aluminum, magnesium and aircraft associations. Cataloging will be done at Wright-Patterson Air Force Base in Dayton, O., by AMC's Catalog and Coordinating Section, Supply Division.

Screening—As a starter, aircraft makers will submit complete lists of extrusion shapes which are considered to be active. These will be screened for those dies which might be needed in structural assembly of USAF or Navy planes.

AMC will determine interchangeability and make cross references of manufacturers' parts and extrusion die numbers. In addition to indexing all standard shapes used, the catalog will list designer, number of dies available, die number and identity and location of the extruder.

Ready Nov. 1—The catalog—"Aircraft Extruded Shapes—Aluminum and Magnesium Alloys"—will be available about Nov. 1.

Ferro-Alloy Plant Going Up

Ohio Ferro-Alloys Corp., Canton, O., is building a new ferro-alloy plant at Brilliant, O., on the Ohio river seven miles south of Steubenville. Scheduled for operation by early fall, the facilities will be used to produce ferro-silicons, ferro-chromium and ferro-manganese. The government certificate of necessity provides for accelerated amortization.

Window Makers Gloomy

With ban on aluminum doors and windows after June 30, they must convert or shut down

FACED with some of the most severe restrictions yet imposed by NPA, the aluminum window business may find itself a casualty of the defense switchover. Manufacturers must get more rearmament work or close up shop after June 30.

That is the date NPA has set for them to stop manufacture of their products. Aluminum windows, doors and ventilating ducts were recently added to the banned list which includes over 200 items such as storm windows and screens, roofing, siding and furniture.

Retooling Problem—Very little if any of their present volume is defense work. Special equipment for fabricating aluminum window products can't be changed over readily.

Fear is being expressed over getting aircraft subcontracts. In the lean years following the last war, many plane builders brought in extrusion machinery and made small structural parts themselves. If they continue this practice during the boom, many small plants will be shut out.

How To Keep Going—Most hope to stay in business on some basis. They had plenty of work in World War II. Chief products were aircraft structural parts, bomb parts and assemblies, ammunition boxes and a variety of sheet metal items. Getting back into this line is now their aim.

Despite plenty of civilian orders so far this year, window men are gloomy. They say they won't get enough aluminum to fill present orders before the deadline anyway, so aren't pushing sales now. They can shift to substitute materials steel, wood, perhaps plastics for a while, but there are limits to their use. Switching emphasis to other manufacturing divisions may save some.

Hustling—Disintegration of distribution systems will probably result. Sales directors are now tracking down possible defense orders, and many distributors and salesmen will find themselves out in the cold.

The prevalent attitude is one of "wait and see." Aluminum window manufacturers intend to push defense orders, but haven't yet given up hope of a materials thaw.

Speed-up for Magnesium Sheet

A continuous rolling mill for magnesium sheet will be installed at Dow Chemical Co.'s Madison Division, Madison, Ill.

It will be in a plant the company bought from the government. The plant also will house extrusion and alloying facilities.

Installation of a continuous rolling mill for magnesium is significant in that it is a step from limited hand mill operations in the magesium sheet rolling field to mass production. To produce magnesium sheets by the continuous process requires unusually high rolling speeds. The plant will process 2000-pound slabs on 84-inch mills.

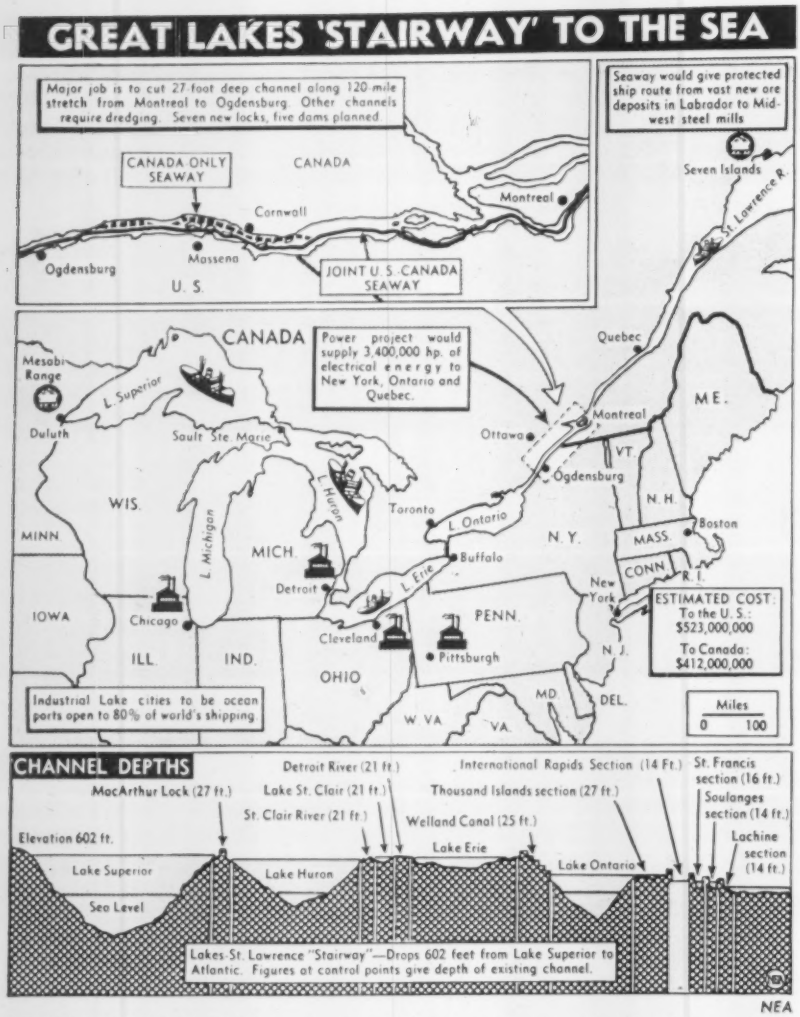
Products at Dow's Madison Division will be magnesium sheet, plate and extruded sections used in airplanes, highway trucks and trailers as well as for construction in a variety of industrial and consumer fields where lightweight materials are desirable. These fields include materials handling, graphic arts, textile machinery, the foundry industry and building equipment.

The Austin Co., Cleveland, will rehabilitate the plant and install the new equipment. The rolling mill is being produced by United Engineering & Foundry Co., Pittsburgh.

Production at the new plant is expected to begin early in 1952.

Powdered Metal Plant Bought

A new subsidiary of Allied Products Corp., Detroit, is Michigan Powdered Metal Products, Northville, Mich. It is believed that powdered metal will be utilized in the manufacture of some of Allied's present precision ground and hardened products as well as those planned for the future.



STRATEGIC ST. LAWRENCE: Supported by top government officials as a high priority defense measure and a wise use of key resources, the $1 billion St. Lawrence waterway and power project is given a good chance for Congressional approval. Boosters of the project say it will permit full-scale industrial output and stimulate economic growth. Hydroelectric sites would generate cheap power, to be equally divided between Canada and the U. S. Potential traffic through the seaway, estimated at between 57 and 84 million tons a year, would be more than sufficient to write off the cost in 50 years. Studies reveal that by 1960 upwards of 40 million tons of foreign ore must be imported

Kaiser Enters the Aluminum Extrusion Field

KAISER Aluminum & Chemical Corp. is entering the aluminum extrusion field. To do so, it is leasing a government-owned aluminum and magnesium extrusions plant at Halethorpe, Md., near Baltimore.

This plant will be the ninth in Kaiser's integrated aluminum operations and the fourth for processing.

At the outset, the Kaiser Maryland plant will operate one 4400-ton extrusion press, two 2500-ton presses and one 1600-ton press.

Kaiser Aluminum is putting emphasis on fabricating the large, heat-treated, strong alloy extrusions urgently needed by the expanded aircraft program, the company pointed out. Kaiser Aluminum will continue to supply aluminum extrusion billets to nonintegrated producers.

The Halethorpe plant, built by the government in 1943 for $7,288,000 and operated by Revere Copper & Brass Co. during World War II, has an annual capacity of 30 million pounds of aluminum billets and 16 million pounds of extrusions, besides magnesium casting facilities and forging equipment. The main manufacturing building with three extensions has a combined floor area of 272,000 square feet and is located on 32 acres seven miles from Baltimore.

Research Unit Aids Defense

Industrial and academic metallurgists will advise the military on critical metals

INDUSTRIAL and academic metallurgists are forming a group to advise the Research & Development Board, Department of Defense, on research aspects of some of the nation's most critical metals problems.

Organized by the National Academy of Sciences-National Research Council under a contract with the Defense Department, the group will call itself the Metallurgical Advisory Board.

On the Way—Its work has already started on research and development phases of three of the most urgent metals problems: Critical and strategic metals and their substitutes; the application of metals to be used at high temperatures; and the development of the presently small titanium industry. Among the metals in critically short supply listed tentatively for the study of the board are columbium, tantalum, cobalt, titanium, molybdenum, tungsten and beryllium. Other metals will be added to the list as the board progresses in its preliminary studies.

The advisory group's job will be to furnish advice and make recommendations which can result in the increased availability of strategic and critical materials. It will also operate in a general consulting and functional capacity where specifically requested.

The Officials—Board Chairman is Dr. Robert F. Mehl, head of the department of metallurgy, Carnegie Institute of Technology. Members are: Dr. E. C. Bain, vice president, United States Steel Corp.; Dr. John Chipman, head of the department of metallurgy, Massachusetts Institute of Technology; Dr. Charles H. Herty Jr., assistant to the vice president, Bethlehem Steel Co.; Dr. Zay Jeffries, retired vice president of General Electric Co.; Walter E. Jominy, supervisor of metallurgical research, Chrysler Corp.; Dr. A. B. Kinzel, president, Union Carbide & Carbon Research Laboratories Inc.; Dr. Paul D. Merica, executive vice president, International Nickel Co. of Canada Ltd.; Dr. Albert J. Phillips, director of research, American Smelting & Refining Co.; Leo F. Reinartz, assistant vice president and manager, Armco Steel Corp.; Dr. Cyril S. Smith, director, Institute for Study of Metals, University of Chicago; Earle C. Smith, chief metallurgist, Republic Steel Corp.; Dr. Kent R. Van Horn, associate director of re-

search, Aluminum Co. of America, and Dr. Clyde Williams, director, Battelle Memorial Institute.

U.S. Steel Boosts Research

U. S. Steel Corp. is forming a research policy committee to place increased emphasis upon research in its mining, manufacturing and distributing subsidiaries.

Dr. R. E. Zimmerman, vice president and director of U. S. Steel Co., becomes chairman of the new policy committee. Other committee members are: C. F. Hood, D. F. Austin, R. M. Blough, M. W. Reed, G. W. Rooney, all executive vice presidents of U. S. Steel Co.; H. B. Jordan, president, American Steel & Wire Co.; Alden G. Roach, president, Columbia Steel Co.; Walther Mathesius, president, Geneva Steel Co.; J. E. Goble, president, National Tube Co.; A. V. Wiebel, president, Tennessee Coal, Iron & Railroad Co.; and Dr. E. C. Bain, vice president for research and technology at U. S. Steel Co. Dr. J. B. Austin, director of research, U. S. Steel Co., will act as secretary.

Motors: They're Hot

Deliveries are a year off in some cases as the copper curbs force cutbacks

MAKERS OF electrical motors are hard hit by materials shortages—copper, aluminum, electrical sheets, plate steel and insulating items.

So severe has been the order restricting copper that at least one major manufacturer of fractional horsepower motors is producing at only 60 per cent of capacity. The pending end-use limits on appliances don't worry him, because he can't supply more than 60 per cent of his appliance customers' needs anyway. Copper curbs are especially severe because they're based on consumption in the first half of 1950, a dull period for many builders.

Big Users—Delivery dates on motors range from 12 weeks to more than a year, depending on the size. Fractional motors, chiefly for appliances, are in heavy demand, as are integral standard industrial units. Appliance makers are the most active buyers on the basis of the number of motors purchased. Machine tool builders are perhaps the largest purchasers on the basis of horsepower. In strong demand, too, are motors to power special machinery in the automotive industry.

No motor producers see much materials relief in sight except through priority help. Some makers allied to the appliance industry have no DO-rated orders, but most manufacturers have at least 10 per cent of their business under priorities. Few have more than 50 per cent, yet.

Ride the Tide—Builders of standard fractional and integral motors for industrial use believe they can get enough materials to stay near capacity operations because most of their production will aid defense directly or indirectly. But makers of fractional horsepower units for appliances or other nonessential purposes will have to find new, rated customers. The aircraft industry is the best bet. Bombers particularly need several motors per unit. Aircraft and radar instruments need small fractional motors. The army will also be needing special motors for gun positioning and other purposes. The Navy will become a big buyer of both fractional and integral motors in its expanding shipbuilding program.

Many manufacturers fear that the new defense business won't develop before midsummer or early fall. In the meantime they may be forced to sit on their hands while their non-defense activities gradually wither away.

New Mill For Chicago

Republic plant will turn out 150,000 tons of seamless products for oil industry

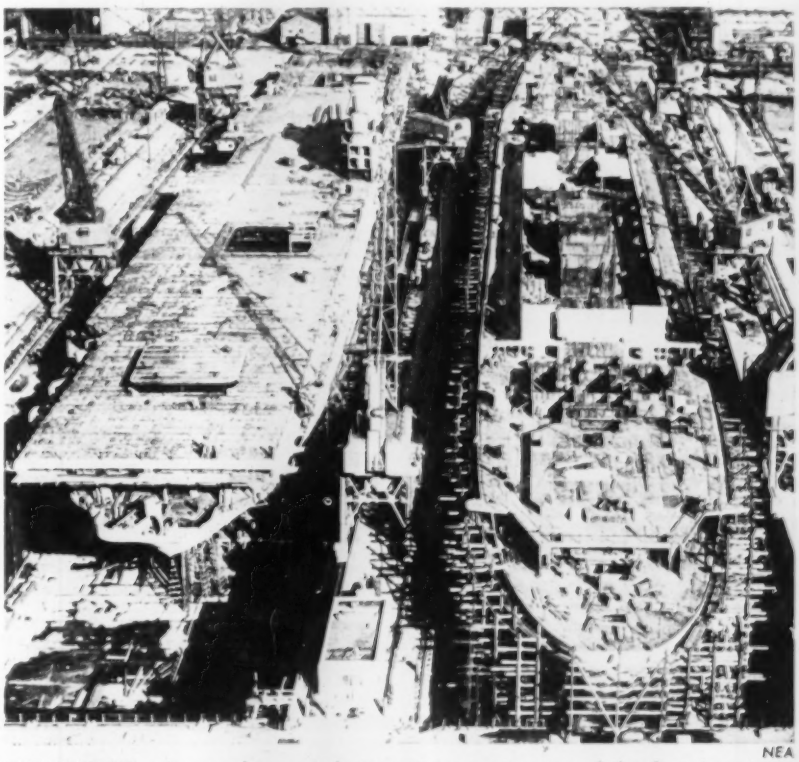
MORE seamless tubing for the petroleum industry and other users will become available early in 1952 when Republic Steel Corp. starts production on a new mill at South Chicago. Work is being started immediately on the new facility which will have a capacity of more than 150,000 tons of seamless products per year. Sizes from 2⅜ to 9⅝ inches will be made.

Republic holds a certificate of necessity allowing a major part of the cost to be amortized for federal tax purposes over a 5-year period.

Boon to Oil Industry—Part of the mill's production will go into oil country casing and tubing for oil wells 10,000 feet and deeper, pipe for high temperature, high-pressure service and refinery still tubes. These require tubing with heavy walls made from special analysis steels.

In addition, the seamless tubing will be used in the manufacture of many types of ordnance and for other defense purposes.

Ingot Capacity Enlarged—Addition-



NEA

SHAPING UP: A record pace is being set in construction of the first American-built superliner at Newport News, Va. In just one year since her keel was laid, 90 per cent of the 48,000-ton vessel's hull plating has been completed. Tentatively named the United States, the liner will probably be launched in June. At left is the aircraft carrier Lake Champlain being reconditioned for the Navy

al steel ingot capacity will be obtained by enlarging existing furnaces. The new seamless mill will be erected in existing buildings adjacent to the finishing facilities of the 44-inch, 36-inch and 32-inch mills on which the tube rounds will be rolled.

A reheating furnace for the billets or tube rounds will be constructed. Tube rounds will be pierced on Mannesmann or parallel axis barrel-type piercing mills, which permit a variation of piercing speeds necessary in the working of alloy steels.

An Assel mill will be installed to provide for high precision in wall reduction of certain specialized types of tubing, particularly those used for bearing stock.

Rounds Out Line—Republic currently is producing electric fusion welded line pipe in diameters up to 30 inches and electric resistance welded line pipe up to 16-inch diameter and oil country casing up to 13⅜ inches.

Steel Shipments Set Record

Mill shipments of steel to the nation's manufacturers and warehouses reached a total of 72,232,292 net tons in 1950, says American Iron & Steel Institute. Shipments were up 25 per cent over 1949 and nearly 10 per cent over 1948, the previous record year. All major industries participated in the gain.

Relative shares by the various industries show:

The automotive industry continued in first place with 20.5 per cent of total, though slipping at year-end.

Jobbers and dealers, serving mainly the small enterprises, took 18.9 per cent, up from 18.1 in 1949.

Direct shipments to construction and to manufacturers of contractors' products were 16.5 per cent, an increase in tonnage, but a decrease percentage-wise.

Railroads got a reduced portion: 6.1 per cent. This trend was reversing rapidly at year's end.

Other industries obtaining record amounts of steel were: Machinery and electrical equipment, appliances, agricultural equipment and containers.

A greater proportion of the steel was in cold-rolled sheets in 1950, that product accounting for 12.9 per cent of all finished steel shipped from mills, compared with 11.8 per cent in 1949. Hot-rolled sheets represented 10.8 per cent in 1950, compared with 10.7 the preceding year. In 1950, hot-rolled bars accounted for 11.1 per cent of mill shipments; in 1949 they represented 11.0 per cent. Plates declined from 9.9 per cent in 1949 to 7.9 per cent in 1950.

Crucible Develops Lean Alloys

Two new alloy steels which conserve scarce and strategic materials have been developed by Crucible Steel Co. of America.

Such scarce elements as cobalt and columbium are used in neither and one alloy contains less than 1 per cent of nickel. Featuring high strength at elevated temperatures, they have possible applications in jet engine parts and special industrial equipment.

Called CSA 39 and Crucible 422, the new alloys are stainless and heat-resisting types.

Ford Gets $7 Million Award for Ammunition

VASTNESS of the nation's mobilization program becomes increasingly apparent with each week's awards of government contracts for materiel and services.

To implement and speed the program, the Army gave Ford Motor Co. a letter-of-intent order for $7 million worth of ammunition parts. The company will start immediately to produce them at its Highland Park Division plant.

Another letter of intent went to Trailmobile Co., Cincinnati, calling for $2 million in heavy duty military-type truck trailers for the Corps of Engineers. Production will begin in the Cincinnati plant in several weeks.

Additional information on the jet engine contract award made to Chevrolet Motor Division of General Motors Corp. was revealed. Previously it was announced only that engine assembly and testing would take place at the company's Tonawanda, N. Y., plant. Now T. H. Keating, Chevrolet general manager, says the contract is for the new Allison J35-A23.

Among the prime contracts awarded by the government are many subcontracting opportunities for metal-working companies. As a help in finding subcontracts, STEEL for the second week is publishing a selected list of government-awarded prime contracts that may offer subcontract opportunities:

Product	Quantity	Value	Contractor
Detector Sets	11,427	$2,000,000	Emerson Radio & Phonograph Corp., Philadelphia
Radio Sets	543	1,250,000	Hallicrafters Co., Chicago
	11,866	300,000	Lewyt Corp., Brooklyn, N. Y.
	380	300,000	Federal Telephone & Radio Corp., Clifton, N. J.
	1,747	400,000	Tele King Corp., New York
	1,746	400,000	Crosley Corp., Cincinnati
	8,410	2,617,927	Emerson Radio & Phonograph Corp., Philadelphia
	147	500,000	Barker & Williamson Inc., Upper Darby, Pa.
	11,451	500,000	Raytheon Mfg. Corp., Waltham, Mass.
	66	247,000	Service Corp. of America, New Hyde Park, N. Y.
Cabinet Radio Sets	5,000	144,025	S. Walter Co. Inc., Brooklyn, N. Y.
Radiosonde Modulators	40,000	572,400	Johnson Service Co., Milwaukee
	5,645	100,000	Garod Radio Corp., Brooklyn, N. Y.
Antenna Equipment	5,870	1,952,014	J. & H. Smith Mfg. Co., New York
Radio Terminals	500	500,000	Rauland-Borg Co., Chicago
Terminal Boxes	87,040	530,240	Cook Electric Co., Chicago
Radio Relay Sets	1,236	1,000,000	ARF Products, River Forest, Ill.
	251	300,000	Espey Mfg. Co., New York
	200	250,000	Rauland-Borg Co., Chicago
Telegraph Terminal Sets	2,604	695,000	Kellogg Switch Board & Supply Co., Chicago
Telegraph Terminal Sets	1,805	2,800,000	Western Electric Co., New York
Radio Transmitter & Receiver Equipment	20 items	8,000,000	Federal Telephone & Radio Corp., Clifton, N. J.
Radio Tubes	15,000	386,327	Federal Telephone & Radio Corp., Clifton, N. J.
Tube Tester	15,114	472,313	Triplet Electric Instrument Co., Bluffton, O.
Trucks, Pole Setters	411	800,000	Highway Trailer Co., Edgerton, Wis.
Signal Generators	1,319	659,500	ARF Products, River Forest, Ill., & Motorola Inc., Chicago
Engine Generators	1,420	200,000	John R. Hollingsworth Corp., Clifton Heights, Pa.
Power Units	850	125,000	Penn Boiler & Burner Mfg. Co., Lancaster, Pa.
	2,500	250,000	John R. Hollingsworth Corp., Clifton Heights, Pa.
	1,570	115,000	Jacobson Mfg. Co., Racine, Wis.
	2,600	250,000	Kohler Co., Kohler, Wis.
	6,000	3,000,000	O'Keefe & Merritt Co., Los Angeles
	3,008	1,300,000	D. W. Onan & Sons, Minneapolis
Carrier Modulators & Repeaters	2,269	7,637,987	Western Electric Co., New York
Repeating Coil	34,016	110,553	Cook Electric Co., Chicago
Rawin Sets	91	1,000,000	General Electric Co., New York
Switch Boxes	9,770	111,231	Siltronic Co., Pittsburgh
Teletypewriters & Reperforators		960,000	Teletype Corp., Chicago
Teletype Repair Parts	2,596 items	1,000,000	Teletype Corp., Chicago
Lineman's Equipment	18,000	464,580	Miller Equipment Co., Inc., Franklin, Pa.
Telephone Switchboard	1	403,130	Automatic Electric Sales Corp., Chicago
Sound Locating Sets	365	1,808,562	Presto Recording Corp., Hackensack, N. J.
Control Boxes	30,000	150,000	Brunswick Radio & Television Co., New York
Controls	7,000	200,000	Lionel Corp., Hillside, N. J.
Mountings	8,000	350,000	American Measuring Instrument Co., New York
Spools & Reels	610	500,000	Arvin Industries Inc., Columbus, Ind.
Air Compressors	15	130,000	LeRoi Co., Milwaukee
Strut Assemblies	400	122,514	Harvick Mfg. Co., Lynwood, Calif.
Tanks (auxiliary fuel)	10,000	1,819,200	Engineering Research Corp., Riverdale, Md.
Maintenance Parts (PBM)	112	107,190	Glenn L. Martin Co., Baltimore
Scrapers	25	100,000	Southwest Welding Co., Alhambra, Calif.
	90	400,000	Heil Co., Milwaukee
Heaters	1,400	200,000	Vapor Heating Corp., Chicago
Water Distributors	225	425,000	Municipal Supply Co., South Bend, Ind.
	175	400,000	Rosco Mfg. Co., Minneapolis
Bomb Leaflet (500 lb.)	25,000	434,500	Pollak Engineering & Mfg. Corp., Newark, N. J.
Percussion Primers	2,310 units	122,430	Arnold Copeland Co. Inc., S. Bolton, Mass.
Brackets	19,435	212,746	Electrix Corp., Pawtucket, R. I.
Shot (90 mm)	34,200	3,909,744	Carboloy Co. Inc., Detroit
Wall Lockers	32,577	342,220	All Steel Equipment Inc., Aurora, Ill.
	47,088	491,596	Barler Metal Products Inc., Goshen, Ind.
	47,703	500,881	Roberts Mfg. Co., Cleburne, Tex.
	39,280	422,135	Borger Furnace Mfg. Co., Pittsburgh

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

Materials Orders

TIN—Amendment of Feb. 23, 1951, to NPA Order M-25 permits use of tin in cans for packing some products, principally food. Amendment effective Feb. 23, 1951.

TUNGSTEN CONCENTRATES — A Defense Minerals Administration order, MO-4, requires suppliers of tungsten concentrates to make deliveries to specific purchasers at the direction of the DMA. This order becomes effective upon publication in the Federal Register.

COPPER—Amendment of Feb. 27, 1951, to NPA Order M-12 extends from Mar. 1 to Apr. 1 the deadline for using copper fins in heating and ventilating equipment used in home and other construction. The additional 30 days are given so industry can adjust its production schedules. Amendment is effective Feb. 27, 1951.

NICKEL—Amendment of Feb. 28, 1951, to NPA Order M-14 permits nickel held in inventory to be used after Mar. 1 in manufacture of certain products, provided the inventories are not suitable for use in the manufacture of other more essential items. Amendment is effective Feb. 28, 1951.

CATTLEHIDES, CALFSKINS, KIPS —Amendment is made Feb. 28, 1951, to NPA Order M-35.

METALWORKING MACHINES — M-40 sets up a system of "pool orders," under which the General Services Administration will place firm orders with manufacturers of machine tools, so tool production for defense can be started quickly. NPA Order M-40, effective Feb. 28, 1951.

METALWORKING MACHINES—M-41 sets up a system for regulating delivery of machine tools that are produced under the "pool orders" system so they will be distributed where they will be of the most benefit to the defense program. NPA Order M-41, effective Feb. 28, 1951.

STEEL PLATES—NPA Order M-1 is being amended to increase the set-aside of carbon and alloy steel plates for defense purposes from 15 per cent to 20 per cent. The increase will be effective May 1, 1951.

Priorities

NPA Regulation 4 issued and made effective Feb. 27, 1951, provides a uniform procedure by which any business enterprise, government agency or public or private institution may use a DO rating (identified by the symbol "DO-97") to obtain limited quantities of maintenance, repair and operating supplies (collectively known as MRO) as well as minor capital additions. The regulation does not limit the quantity of MRO or capital additions that a person may obtain without using this DO rating, but if he makes any use of the rating in any calendar quarter his total acquisition of MRO (rated or unrated) for that quarter becomes subject to the limitations of the regulation. The rating cannot be used to obtain materials for personal or household use.

To provide for an orderly transition to the MRO program, NPA issued Direction 1 to Regulation 4. The direction, effective Feb. 27, 1951, provides that during the rest of the first quarter of 1951 businesses may take half of their quarterly quota, disregarding their MRO purchases prior to Feb. 27. The DO-97 priority rating may be applied to nonrated MRO orders now outstanding. Any orders so rated prior to Mar. 15 shall take effect Mar. 15. New DO-97 orders placed prior to Mar. 15 shall also carry the Mar. 15 effective date, but rated MRO orders placed on or after Mar. 15 shall take effect as of the date that rating is applied.

Amendment of Feb. 27, 1951, to NPA Regulation 2 revises that regulation with respect to use of ratings for procuring accessories to production equipment. Procurement of these accessories is now covered by NPA Regulation 4 and NPA Direction 1 to Regulation 4.

Directives

FREIGHT CARS — Directives were issued by the NPA to steel producers to provide 288,500 tons of steel products during May for the domestic freight car construction and repair program. This amount of steel is sufficient to permit production of 9000 new cars and for car repairs for the month. Program for the first four months of this year provided approximately 310,000 tons of steel a month for new cars and for repairs. This tonnage was based on a production target of 10,000 new cars a month.

Price Regulations

Supplementary Regulation 5 to the General Ceiling Price Regulation is an interim measure to continue ceiling prices on new and used automobiles until a permanent industry regulation can be prepared. Supplementary Regulation 5 was effective Mar. 2, 1951.

Amendment 2 to the General Ceiling Price Regulation reduces prices of some manufacturers and wholesalers who are taking advantage of isolated sales before the price freeze to establish abnormally high ceiling prices for their goods and services.

Wage Regulations

General Regulation 6 of the Economic Stabilization Agency provides opportunity for adjustments of wage and salary inequities arising through increases in the cost of living. It would allow increases up to 10 per cent above the level of Jan. 15, 1950, without further approval of the Wage Stabilization Board.

Delegations

NPA Delegation 9 of Feb. 26, 1951, delegates to the secretary of interior authority over production and distribution of industrial chemicals used principally in the petroleum industry. The delegation is effective Feb. 26, 1951.

Boron Heats on the Way

Six mills are shipping two types to implement and auto builders to replace alloy grades

NEWS reports of "first commercial production" of boron-treated lean-alloy steel heats are a little on the enthusiastic side. Many steel companies have used the boron-needling treatment for years, and the literature is replete with details of its salutary effects. The story now is that large users of constructional steels are bumping up against alloy shortages again, and naturally turned to reconsideration of boron treatment.

Working with the steel industry's technical committee, consumers have pushed research studies and have suggested that it might be possible to go even further on alloy conservation than during World War II. The results appear to be paying off in the form of two new series of lean-alloy steels which make important savings (STEEL, Feb. 19, p. 38) in nickel, chrome and molybdenum.

Test Heats Poured—Six steel companies—United States Steel, Bethlehem, Youngstown Sheet & Tube, Republic, Crucible and Wisconsin Steel—are making two heats each of the new series for early shipment to selected customers. Meanwhile, other anxious steel users are besieging the industry for more information. In reply the technical committee says:

Standard carburizing grades of all steels can be replaced by one of the new steels of the following composition: Carbon, 0.17-0.23, manganese 0.45-0.75, chromium 0.15-0.35, nickel 0.20-0.40, molybdenum 0.08-0.15, plus boron approximating 0.002 per cent. Grades which can be replaced by this analysis are SAE-AISI 1320, 2515, 3120, 4118, 4620, 5120, 8620 and 8720.

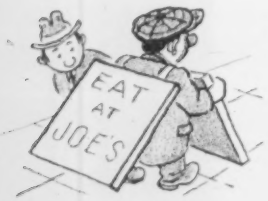
In order to replace standard grades 4023, 4027 and 4028, no boron is required, but carbon content is raised to 0.19-0.25 or 0.23-0.30 per cent, the latter containing sulphur for better machinability. Standard 4320 can be switched to standard 9417 plus boron.

Standard full-hardening grades can be replaced by one of the new steels containing: Carbon 0.36-0.44, manganese 0.70-1.00, nickel 0.20-0.40, chromium 0.15-0.35, molybdenum 0.08-0.15 per cent, plus boron. Standard grades which it replaces are 1340, 4047, 4640, 5140, 8640, 8740 and 9440. In order to meet properties of grades 3140 and 4140, chromium is 0.30-0.55 per cent.

Quenched Higher, Tempered Lower—Heat treatment of the new lean-alloy materials is essentially the same as for the standard grades, with the exception they should be quenched 75° higher, tempered 75° lower.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*



Advertising Expense Allowable

Bankers: Relief from Liability?

Inventors At It Again

Ten Rivers Studied

Industrial advertising expenditures have the same ground rules as in World War II. For renegotiating, the rules are about the same; for cost-plus, they're a little stricter

RULES governing industrial advertising expenditures are essentially the same as they were during World War II.

The Bureau of Internal Revenue's treatment of advertising expenses for tax purposes has not been changed since 1942. General rule is: All legitimate advertising is a necessary business expense and will be allowed.

For renegotiation purposes, to which practically all military contracts will be subject, the rule is quite similar to that of the Bureau of Internal Revenue: Any necessary and reasonable advertising will be allowed as a cost item. This condition probably will continue unchanged as the renegotiation bill in Congress provides the procurement agencies are to consider as proper business expense those items which are allowed for tax purposes.

Under cost-plus contracts, where contractor must justify every cost, the rule is more strict. Generally, a reasonable amount of advertising in business and technical journals is allowed provided such advertising does not offer specific products for sale but is placed in magazines that are valuable for the dissemination of technical information within the contractor's industry. (See Section XV of Armed Services Procurement Regulation which lists contract cost principles.)

The armed services will place as few cost-plus contracts as possible. Generally these will be awarded only where the product is entirely new or where the contractor must do a large amount of development work.

Early Settlement with FTC?

An early settlement is sought by the Federal Trade Commission in its action against the basing point-delivered price system employed by the steel industry before it adopted the reasoning of the commission, in the cement case, by going to the present f.o.b. mill method of quoting. Negotiations have been under way for some months between commission attorneys and steel industry lawyers. The two groups are to report to the commission on Mar. 12.

Amendment To Relieve Banks . . .

Legislation to encourage banks to make loans to defense contractors has been recommended by the Federal Reserve Board of Governors to the Senate Banking & Currency Committee. Although procurement agencies are authorized by the Defense Production Act to guarantee the loans, the Comptroller General ruled last year that banks making such loans will be liable for any recovery found against the contractor in subsequent renegotiation—and that has discouraged banks from financing defense contractors. The proposal of the Federal Reserve governors calls for an amendment to the War Claims Act to relieve banks of any liabilities incurred as a result of making defense loans and transferring these liabilities instead to the procurement agencies guaranteeing the loans.

100 Appeals a Week . . .

Appeals to the NPA Iron & Steel Division for help in obtaining steel are averaging about 100 a week—a decline from the volume of a few months ago. All requests are examined carefully and where real hardship exists—as where plant shutdowns are threatened—limited assistance is given on an informal basis by persuading mills in a position to do so to supply the needed steel.

Committees on Shortages . . .

Six international committees to deal with shortages of defense materials were formed by the State Department. The first, dealing with copper, zinc and lead, held its initial meeting in Washington, Dec. 25. The others will begin work in March and April; they will deal with sulphur, cotton, tungsten, molybdenum, manganese, nickel, cobalt and wool.

The committees will have no allocating powers but will recommend measures to increase production and improve distribution and promote more effective use. Participating countries, besides the U. S. are: Belgium, Canada, Chile, West Germany, France, Italy, Mexico, Peru and Great Britain.

Automatic Flanging, Etcetera . . .

More patents of interest to industry have been released by the Atomic Energy Commission. One of them—No. 2,536,602, issued to J. J. Goett, Chicago, Jan. 2, 1951—covers an "automatic flange system—a device for opening, closing and sealing pipe joints and junctions by remote control." Others cover new inventions in fast impulse circuits, alternating current generators, bearing test apparatus, mechanism for automatically shutting off flow of a liquid, fluorination of lubricating oil, amplifiers operating on minute currents, and water decontamination apparatus. The list may be obtained by writing the Atomic Energy Commission, Washington 25. Ask for Release No. 343.

Rivers in America's Future . . .

A strong boost for federal government development of all major streams in the United States is the outstanding feature of Volume 3 of the report of the President's Water Resources Policy Commission headed by Morris L. Cooke, Philadelphia. Entitled "Ten Rivers in America's Future," it suggests the same approach on problems of the Ohio, Columbia, Missouri, Rio Grande, Colorado, Potomac and other rivers that was made on the Tennessee river by the Tennessee Valley Authority.

Wide World

NOT AN INVASION: Unloaded from a Royal Hellenic Navy landing ship near Aliveri on the island of Euboea, Greece, is a bulldozer for use in building a new 68,000 kilowatt steam generator electric plant. The Marshall Plan project will augment Athens' present supply of electricity as well as furnish power for the Chalkis area

World Fuel Shortages Tackled

Steelmaking potential improved as the Ruhr swaps steel for U. S. coal, South Africa expands coal facilities and Venezuela considers reducing iron ore with gas

FUEL shortages which in turn can mean pig iron and steel scarcities are being solved in widely different areas of the globe to aid in boosting the Western World's steelmaking capacity.

The U. S. is swapping its coal for West German steel. The American bituminous is not being used in Ruhr coke ovens directly, but is to be consumed as fuel for gas plants at Hamburg, Bremen, Kiel and Luebeck. Coal shipments from the Ruhr to the north will be relieved accordingly.

Additional coal washing facilities have been installed in South Africa to help relieve the coke and steel shortage in the union.

Further tests of Venezuelan iron ore reduction with gas, conducted in Sweden, have encouraged the Venezuelan government to go ahead with plans to build a steel plant in the eastern part of the South American country.

Ruhr To Ship More Steel to U.S.

West German firms, mainly in Dusseldorf, have contracted to buy 1.4 to 1.5 million tons of U. S. coal. The German companies agree to ship 200,000 to 250,000 tons of rolled steel products to America in exchange.

The prices of the American coal, c.i.f. Hamburg, will be about double of German inland prices, but they will be absorbed by the centralized German coal selling agencies. The prices for the steel exports are high, but at a level now prevailing on steel exports in Western Europe. The swap had the tacit approval of U. S. officials in spite of the high prices.

Coal is the limiting factor in Ruhr steel production. Only 975,000 tons of bituminous will be available for the steel industry in March, compared with 1,250,000 last October. That will limit Ruhr steel output to 1 million net tons this month, although 1.2 million were produced in October and November.

West Germany's industry now has surpassed 1936 production levels by 30 per cent except in steel and coal. Output of both those materials is about on par with 1936 performances.

If steelmen can get more American coal, they may improve the steel situation. Additional coke ovens with a capacity of 3000 tons monthly are being installed and another 5000 to 6000 tons of coke oven capacity may be in operation by 1952.

South Africa Boosts Capacity

Raw material processing and mining equipment is being integrated with steelmaking facilities in South Africa to boost the union's annual ingot capacity to a rate of 1 million tons soon.

Iscor, the government-backed steel company in the union, operates six blast furnaces, three at Pretoria, two at New Castle in the Natal district and one at Vanderbijl Park near Johannesburg. A seventh is planned for operation at Vanderbijl Park within the next six months. Vanderbijl will eventually be the largest steel mill in South Africa. A slabbing mill there will be ready soon and the open-hearth shop has just been enlarged. Slabs will be used in the plate mill which has been in operation for seven years. Hitherto that mill has been fed from the Pretoria mills.

Construction on the Pretoria steel plant was started in the late 1920s, but was delayed because of the depression. The No. 1 blast furnace was not blown in until March, 1934. Coal for the Pretoria facilities comes from New Castle in Natal and Witbank in Eastern Transvaal, about 20 per cent New Castle and 80 per cent Witbank being used in the mix. Ore comes from mines in North Transvaal.

Venezuela Will Try Gas

The Venezuelan plant that will reduce iron ore with gas will be built near where the Caroni river flows into the Orinoco in eastern Venezuela.

The location is strategically near the El Pao iron deposits of Bethlehem Steel Co.'s Iron Mines Co. of Venezuela and the hydroelectric power works to be built at the Caroni falls. Within a reasonable distance are the eastern oil wells where natural gas for the reduction process will originate. A pipe line will be laid to carry the gas to the plant.

The government agency in charge of the project, Venezuelan Development Corp., made preliminary studies some time ago and is now conducting more advanced research with the help of Canadian engineers. Tentative plans for the first phase of the project call for a 70,000-ton annual output of structural products. Plans call for eventual production of 2 million tons of finished products yearly.

Although the project is still in the tentative stage, Bethlehem and U. S. Steel may be interested in the gas reduction plant. Ore costs about $5 a ton to ship from Venezuela to the U. S. Costs could be cut if the ore were first reduced in Venezuela and the waste not shipped.

Venezuelan officials estimate that power can be generated at the Caroni hydroelectric plant for less than 10 cents per 100 kilowatts. That low cost opens the possibility of also processing Dutch Guiana bauxite to make aluminum near the Caroni site.

The Light Turns Red

More will do so in 1951—if there's enough aluminum—as signal makers sight big year

A STOP-AND-GO industry hopes the aluminum shortage won't red-light its production plans for 1951.

Makers of traffic signals say a peak year is possible that will exceed 1950's sales of about $5 million as backlogs mount and local governments prepare to spend 25 per cent more on traffic this year than last. Some, but not all, of that 25 per cent increase is for signals.

The Reason Why—Traffic congestion explains why the signal industry hopes to have dollar sales this year at least five times the $1 million volume of 1940. About 31 million motor vehicles were registered in the U.S. before the war. Now more than 45 million snarl city traffic. Four companies make most of the signals in the U.S.—Crouse-Hinds Co., Syracuse, N. Y.; Eagle Signal Corp., Moline, Ill.; Marbelite Co., New York; and General Electric Co. at its Lynn, Mass., plant.

Aluminum is the major material in signals; glass is the second most important by weight. Aside from aluminum, few critical materials go into signals. Most of the parts are made from die castings. The chief manufacturers design and fabricate both the signals and the controls.

Pioneer—The first installation of traffic signals in the U.S. was made in 1914 at Cleveland's 105th street and Euclid avenue, says K. W. Mackall, manager of Crouse-Hinds' traffic signal department. Salt Lake City installed the first electrically interconnected system in the world and in 1917 had a series of six lights which a motorist could drive through at 20 miles an hour. The first traffic signal installation didn't appear in New York until 1919.

The early 1920s was the era of the traffic towers; the first one was built in Detroit in 1919. Until 1923 those ornate traffic obstacles were a landmark in many American cities.

Golden Age—From 1922 to 1927 came the gilded era of traffic signal installation as cities struggled to cope with the growing downtown congestion. The traffic signals themselves today are much the same as they were in the middle 1920s, but control apparatus has been revolutionized.

The problem of traffic signal makers is to keep vehicles moving, not stopped. First came the individually controlled unit—all right if it's the only signal in the area, but inadequate in a congested section. To get order for a whole area, the simultaneous system was next developed where all lights in a series change at once. That still works where block lengths are long, but a more flexible system was needed.

A First for Chicago—Charles MacIlraith of the Chicago Surface Lines worked out the first full, flexible, progressive operation, for Chicago. The installation for 53 corners was made in February, 1926, and consisted of a timer for each intersection, all controlled by a master timer. The green indication was off-set so that it was possible to drive continuously without stop on any one street.

Traffic signal producers today make units that cost less than in the early 1920s, despite inflation. That four-way, three-section light which turns red just as you rush to make a 10 o'clock appointment is part of a unit that now costs about $186. It would have cost $250 to stop you in the early 1920s; $177 in 1926. Controllers cost about $238 in 1938, approximately $330 now.

Materials Handlers To Meet

Completion of the American Materials Handling Society conference program shows 58 speakers set to educate leaders in as many specific industries on the latest handling techniques. The handling exposition, to be held concurrently with the conference, already has reservations from 200 companies which will display new models over ten acres of floor space.

Principal speaker at the Society luncheon May 2 is Rear Adm. M. L. Ring, S. C., U.S.N., director of supply management, Munitions Board, Washington. The conference and exposition are Apr. 30-May 4, at the International Amphitheatre, Chicago.

UP-TO-DATE: Operations of a new push-button telegraphic center at American Steel & Wire Co.'s headquarters in Cleveland are studied by company officials. Left to right are V. H. Leichliter, A. J. Hoyt, and W. F. Munford. Teleprinter and push-button panels are shown

ASTM Plans Spring Meeting

Analysis of thermal insulating materials, presented in a symposium of five papers will feature the 1951 spring meeting of the American Society for Testing Materials.

Ray Thomas, staff engineer, Carbide and Carbon Chemicals Corp., heads the committee preparing this topic. An added subject calls for presentation of a series of technical papers on "Soil for Engineering Purposes." ASTM meets Mar. 5-9 at the Netherland Plaza Hotel in Cincinnati.

NACE Conference Mar. 13-16

Engineers attending the 1951 conference of the National Association of Corrosion Engineers will see a record 79 exhibits set up in the Hotel New Yorker, New York, for the four day show.

This year's session, beginning Mar. 13, will include symposia on these topics: Corrosion principles; the pipeline industry; transportation; protective coatings; the oil and gas industry; cathodic protection; the electrical and communications industry; industrial use of corrosion inhibitors.

Waterbury-Farrel Is 100

The Waterbury-Farrel Foundry & Machine Co., of Waterbury, Conn., celebrates its centennial year of operation in 1951. Founded in March, 1851 by Almon Farrel, the company now employs 900 and is equipped to turn out 44 types of metalworking machines in its 400,000 sq ft of floor space.

50 Candles for Buckeye Brass

Buckeye Brass & Mfg. Co., Cleveland, is celebrating its 50th anniversary as a producer of bearing bronze and various types of bearings and bushings.

The Air Gets Cleaner

Industry helps by spending $400 million a year to curb smoke and fumes

U. S. INDUSTRY is spending $400 million a year to combat air pollution in a program that shows no sign of slackening because of defense mobilization.

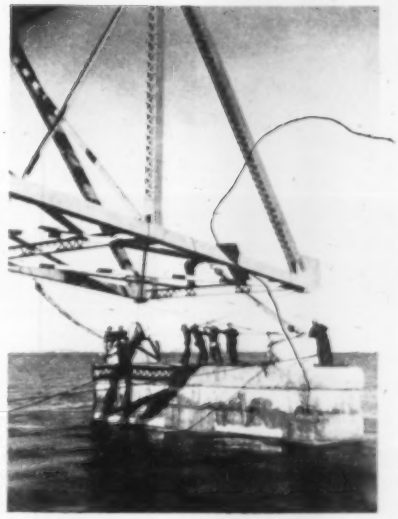
"Businessmen are to be congratulated. Almost unheard of in 1945, air pollution control is now an accepted responsibility," says H. G. Dyktor, commissioner of Cleveland's control program, the second largest in the country on the basis of the staff and budget allotted by the city to administer it. The largest is in Los Angeles.

Double Duty—Some of the $400 million being spent may do two jobs—help clean the air and give the company a more efficient operation, too. Defense efforts may spur, not hinder, developments because control apparatus can be pre-engineered into new plants at far less cost than it can be adapted to old facilities. Industry is expected to spend a record $22 billion on all new plant and equipment in 1951. Costs of control apparatus are rising, but not as much as for most kinds of equipment because manufacturing efficiencies have developed. Control apparatus has been made in far greater quantity since the war than at any other time. Some companies have received necessity certificates to write off the cost for tax purposes in five years.

Cleveland estimates that its program has taken 32 per cent of the dust and soot out of the air in five years. In 1946, its tests indicated that 52.5 tons of dust and soot were in the air per square mile per month in the city. In 1950 that tonnage fell to 35.5. Complete freedom from pollution is impossible, all industrial cities recognize, but more improvement is expected. Virtually every major city in the U. S. now has a control program, and budgets are rising. Cleveland has a $165,000 allotment for 1951, slightly more than in 1950. Some $40,000 of that is returned to the city in inspection fees.

Forerunner—An annual program of inspection of all commercial and industrial firing installations in Cleveland was started late in 1949. That plan is being adopted elsewhere. Most cities now have performance-type ordinances that make no specifications about the design of firing equipment or the fuel used as long as no smoke or fumes are emitted into the air.

The major part of the pollution problem is still caused by industry. Only a few areas even bother with controls on domestic pollution.



ASSIST FROM NATURE: Engineers of Bethlehem Steel Co. building this bridge in Boston harbor position spans at flood tide. Steelwork is then lowered into position by ebbing tide. Spans 250 feet long and weighing 210 tons are carried on wooden barges

Big Business To Curb Pollution

The intensifying campaign against stream pollution is nearing the stage in which the equipment needs will constitute big business.

Dr. Leonard A. Scheele, surgeon general, Public Health Service, estimates a need across the nation for 6500 municipal sewage treatment plants—in places where there are none at present or where existing facilities are found to be outmoded or inadequate.

In addition, he says, industrial establishments which use separate outfalls need new or improved waste treatment facilities. And these figures are minimum, for data has not yet been made available on some 1600 communities and 4600 industrial establishments which are suspected of creating their own stream pollution problems.

If these needs are not met, says Dr. Scheele, there will be trouble, for "the expansion programs envisioned by the President cannot be achieved without control measures which will allow the re-use of critical water supplies. The problem is particularly acute for the steel, chemical, pulp and paper, synthetic fuel, synthetic rubber, munitions and other industries that require water in large quantities."

Tank Vapor Standard Set

To protect workmen from escaping gas, vapor or mist involved in open-surface tank operations, a new safety code has just been approved and published by American Standards Association. It's number Z9.1-1951.

Operations involving the immersion of materials in liquids and their subsequent removal are covered in this code. Those include electroplating, washing, anodizing, pickling, quenching, degreasing, alkaline cleaning, stripping and rinsing.

Steel Firms Push Smog Control

Every minute, steel companies wash more than 7 million cubic feet of blast furnace gas as part of their programs for abating air pollution, says American Iron & Steel Institute.

Many kinds of equipment have been developed in the fight against blast furnace air pollution. Centrifugal force, water, pressure, electrical and sonic equipment and dozens of other devices are being used. An electrical precipitator 60 feet high has been installed by a West Coast steel company as part of a cleaning system for exhaust gases from open-hearth furnaces. An estimated 96 per cent of the furnace pollutants is removed.

Dust Diseases Need Study

Industry would profit by taking a leading role in the movement to solve the problems of lung diseases due to dust, says Dr. Kenneth M. Lynch, president and professor of pathology at South Carolina Medical College.

Dr. Lynch was one of the speakers at the congress on industrial health at Atlanta, Feb. 26-28. The meeting was sponsored by the Council on Industrial Health of the American Medical Association and related groups.

Plates for Gasoline Tanks?

Will tetraethyl of lead be stockpiled for future large-scale production of aviation gasoline? That question is under study by the Munitions Board. If the answer is "yes," a large tonnage of steel plates will be needed to set up ample tank-farms.

Canada Offers Cobalt Incentive

Measures to establish an emergency stockpile of cobalt ore have been taken by the Canadian government. It will also accelerate production of iron ore in Labrador, and probably at Steep Rock.

Now, more than ever before, America must make full use of its steel-making capacity and conserve its natural resources. Now, more than ever, there is national significance in the phrases, "*Make a ton of sheet steel go farther*" and "*Make your product last longer.*"

These low-alloy, high-tensile steels do "make a ton of sheet steel go farther"—for their inherently higher strength is 50% greater than mild carbon steel. That means, in turn, that 25% less section can be used with safety, and where rigidity is important, this can usually be compensated for through slight design change.

"Make your product last longer" is no idle claim. The much greater resistance of N-A-X HIGH-TENSILE to corrosion, abrasion, and fatigue assures longer lasting products even at reduced thickness.

Explore the potential economies to be derived from the use of low-alloy, high-strength steels—and then specify them. Their use can add materially to our national conservation program.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor, STEEL*

Mirrors of Motordom

Off-again, on-again orders about nickel have Detroit auto and plating men in a stew. New amendment to an amendment relaxes some end-use provisions

DETROIT

ORDERS, amendments and partial recisions of amendments on the use of nickel have automotive and plating men running around in circles.

Last December came NPA's M-14 which limited all consumption of primary nickel for nondefense purposes during the first quarter of 1951 —except for maintenance, repair and operating supplies—at 65 per cent of the average quarterly consumption during the first half of 1950. That was bad enough, but the Jan. 23 ammendment to M-14 appeared to be the death-knell to the plating industry and the end of much glittering trim on cars. The amendment also limited the end-uses of nickel and specifically prohibited many automotive applications.

Scurry for Substitutes—That sent platers and automotive men hustling to the laboratories for a finish to substitute for the copper-nickel-chromium combination. Some alternates have been developed but nothing sensational. Platers, particularly, complained bitterly to Washington about the effects of the amended order. Last week came an eleventh-hour reprieve just before the amended order was to go into effect Mar. 1.

The partial recision of the Jan. 23 amendment permits platers to use nickel from inventory up until June 1 for end products on the Jan. 23 nonessential list. But there's a catch there, too. The inventory nickel may be used on the nonessentials only if it's unsuitable for defense use. Just how much nickel will become "unsuitable" remains to be seen.

Around and Around—And still another nickel wrinkle is bothering auto men. Some of them already have made other arrangements for their finishing. Should other set-ups, often laboriously planned, be discarded when the nickel reprieve will be only a partial one and will expire by June 1 anyhow? Also, the original 65 per cent limits on use of nickel still hold.

The matter will be decided when Detroit determines how satisfactory the alternate methods will be. One finish involves the use of bright plated and sealed zinc. Another finish is accomplished by chromium plating directly over the buffed copper base. The question about the latter technique is its durability.

Metal Curbs Assessed

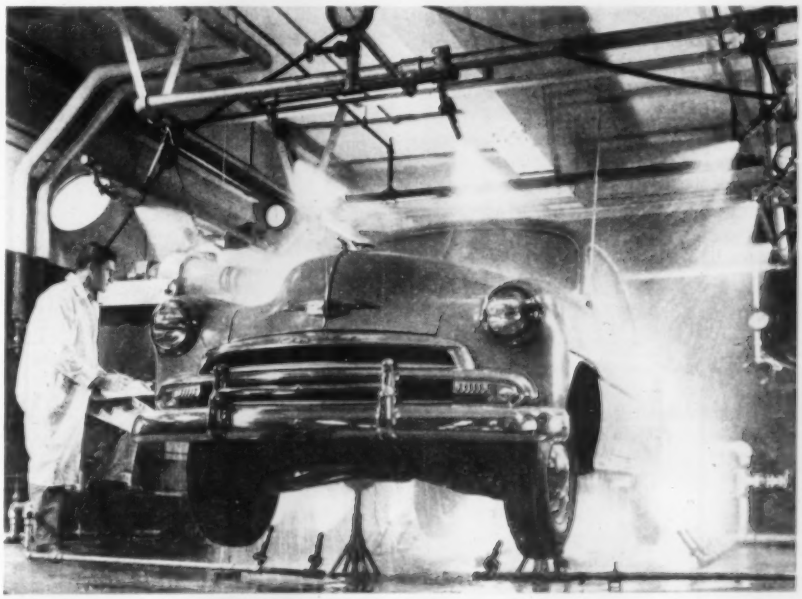
Many industry men would gladly horse-trade away this easing of nickel-use limitation for relief from the pending steel, copper and aluminum orders. Exactly how those will affect the industry cannot properly be assessed yet. The steel order will appear to a great many manufacturers as pure and simple "window dressing."

Take the case of the auto spring maker who reports that his steel quota will be only 25 per cent of his requirements for April. He would be tickled to death to find the NPA order guaranteeing him second quarter steel consumption at 80 per cent of the quarterly rate of first half 1950.

Migraine—The Copper order may give the industry its biggest headache. Already it is difficult to obtain car heaters in some localities. Parts distributors are trying to put these in sections where the climate requires heaters, but their efforts are not entirely satisfactory yet. For some auto makers who know the steel conversion route backwards, forwards and blindfolded, the tightening up of copper consumption is more significant than the limit on steel.

Interplay of the new orders on aluminum, copper and steel therefore reduce all figuring on new car production in second quarter to the realm of guesswork. But accepting that this is the case, there still is some comfort to be derived from calculations:

Still High—Using the figures for average quarterly production of cars during the first half of 1950 as base on which to apply the 20 per cent steel use reduction, and making due allowance for an equitable adjustment to those companies whose production was restricted, you arrive at a second quarter U. S. car production of about 1,420,000 units, divided thusly: General Motors 599,000, Ford 324,000, Chrysler 316,000, the independents 181,000. Such a production would compare favorably with all but a few periods in automotive history. During the last two decades only third quarter, 1949, and the final



SUPREME TEST: 500 gallons of water are shot at abnormal pressure over a '51 Chevrolet while a vacuum created inside the body tries to pull in some moisture. The four-minute blast must be withstood by each experimental Fisher Body model before it is approved for production

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three quarters of 1950 saw greater output.

Of more significance possibly than is generally realized are the exceptions which NPA makes to cure the inequalities of its overall orders. The automobile makers are sure the NPA orders will permit each company to maintain its competitive position. Chrysler, of course, would be unfairly treated if the order applied to its consumption of the three materials during first half 1950, when it was strike-bound. At least three independents also can plead hardship on the selection of the base period—they were changing models during part of that time. None of these companies has yet been told by NPA how its case will be handled, but all are going under the assumption that some of the better months of 1950 will be used in the consumption determination.

Pessimists—There are a few automotive men and observers who believe the market will not even support an output of 1,420,000 units in the second quarter. They're in the minority, but they contend that a decent portion of the present demand for cars will disappear when it becomes clear that the government has no intention of halting all car production.

These people feel that there are five reasons for the inflated demand of the moment. Initial one is the "scare" buying psychology—the "I'll get mine before they're all gone" type. Possibility of higher excise taxes, likelihood of higher retail prices, chance that credit restrictions will be stiffened further, and love of the present bright work also figure in this demand. Dealers have done next to nothing to dispell the fear complex. Some have given it a boost at every opportunity, and will reap a bitter harvest as a result. Price gouging, however, is being sat upon fast by the government and the car makers this time.

Price Rule "Temporary"

Placed in effect last Friday, Supplementary Regulation 5 to General Ceiling Price Regulation, according to Office of Price Stabilization, is a "temporary means" of correcting car pricing problems. It establishes retail ceiling prices for new cars and provides a method to bring used car prices under control—through use of the five guidebooks employed by dealers as "yardsticks." On one point is the order not sufficiently clear—determination of the trade-in value of cars on newer models. The dealers are asking clarification of what is meant by "reasonable value to the dealer" which the order insists they offer.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	669,808	609,878
February	624,300	505,593
March		610,680
April		585,705
May		732,161
June		897,853
July		746,801
August		842,335
September		760,838
October		795,947
November		633,678
December		671,284

Weekly Estimates

Week Ended	1951	1950
Feb. 3	151,206	127,428
Feb. 10	116,020	125,737
Feb. 17	177,932	123,712
Feb. 24	192,243	125,285
Mar. 3	185,000	124,072

Estimates by Ward's Automotive Reports

* Preliminary.

G.M. Payrolls Hit Peak

General Motors payrolls, President C. E. Wilson and Chairman Alfred Sloan Jr. announce, reached an all-time high at $1.8 billion in 1950. That compares with $1440 million in 1949. Average number of salaried and hourly-rated workers totaled 465,239 last year, setting a peacetime record and equalling the wartime peak employment during 1944. The 1949 employment figure was 401,326. In United States plants, hourly-rated employees averaged $75.58 a week as against $68.41 in 1949. There were 336,933 of these workers in the United States GM operations.

Separate Defense Job

One GM division—Chevrolet—has moved to set its defense manufacturing work apart from normal civilian production. The separation went into effect Mar. 1 when the division's general manufacturing manager, W. J. Scott, designated B. D. Marshall manager of defense manufacturing plants. Up to now Marshall has been assistant manager of the Flint Manufacturing Division. Moving now to Detroit, he is charged with responsibility for company and government-owned plants which Chevrolet will operate wholly on defense work. One of these is aviation plant No. 1, Tonawanda, N. Y., whose new manager, A. R. Roskilly, had been manager of the Muncie, Ind., Chevrolet plant. He is succeeded at Muncie by Edward Ravas, formerly general superintendent of production at the Saginaw transmission division. To be built at Tonawanda will be Allison Division's new turbo-jet, the J35-A23.

For the Want of a Nail . . .

"For want of a nail a kingdom was lost." This tragic little tale has a modern parallel which is now being told by Briggs Mfg. Co. to its employees. A booklet entitled "Is Your Job Slipping Through Your Fingers" emphasizes the importance of small parts used in automobile body assembly, stresses that lack of them completely stops production lines.

During 1950, the cost to Briggs of small standard parts which were lost or carelessly damaged was $171,563.04. One man is kept busy doing nothing but cleaning usable parts out of bodies. His gleanings per car are a double-handful. After they are recovered they must be completely resorted before they are of any use.

The booklet makes no attempt to set a value on the good will that is lost from the annoying rattles caused by loose bolts and screws which drop into completely inaccessible parts of the car.

Chrysler Gets Proving Ground

Chrysler at long last has let a cat out of the bag. The sole "Big Three" automaker with no proving ground got 3800 acres 13 miles west of Ann Arbor, Mich., for road testing. The land is now being fenced in, existing farm buildings torn down and roads being built. "Obvious practical reasons" kept Chrysler from making the announcement sooner.

Chrysler is also planning to double the size of its proposed engine plant downriver at Trenton, Mich. Originally designed to contain 500,000 square feet, the plant will be built to the larger size if materials can be obtained. Defense requirements and needs for greater engine manufacturing capacity influenced the decision to expand.

General Motors has also been in the land-buying business. It last week acquired 106 acres adjoining its technical center now being built in Warren township, north of Detroit.

Goodyear Tire & Rubber reveals development of a new process claimed to increase the effective output of synthetic rubber plants by at least 20-25 per cent. Utilizing materials and practices known to the industry and combining the best features of "cold" rubber and buna the new rubber is suitable for use in tires. Goodyear's process has been placed at the disposal of the government's rubber reserve officials.

The Business Trend

New postwar record set by industrial production index. Big jump in auto production gives push necessary to put index to new high

A NEW postwar record was set by industrial production in the week ended Feb. 24, preliminary figures for the week indicate. These figures pushed STEEL's industrial production index to 223 per cent of the 1936-1939 average. The new level is 1 point above the previous postwar record established last October. To reach the new high, the index rose 4 points over the level registered in the week ended Feb. 17.

Making the new record particularly impressive is the fact it was set only two weeks after the railroad switchmen's strike had plunged the index to its lowest level in weeks. From this low mark of 197 the index rebounded to 219 in the week ended Feb. 17 and then soared on up to 223 per cent.

Ability to recover from a blow such as the strike demonstrates the robustness of the dual production program—civilian and defense. Although some civilian production has had to be dropped, it is still huge. When to it a growing defense program is added, the net result is a giant-size industrial production volume. Ability of such a volume to exist testifies to the substantial expansion being made in the country's industrial production capacity.

Big Push by Autos . . .

Contributing the most to the rise of the industrial production index in the week ended Feb. 24 was the automobile industry. It produced 192,243 passenger cars and trucks, the greatest number since the week ended last July 15. To attain this figure, the auto industry pushed its output up 14,311 over the week ended Feb. 17.

Overtime work, reminiscent of the industry's peak periods of 1950, helped bring about the high production in the week ended Feb. 24, says *Ward's Automotive Reports*, which pointed out no expedient apparently is being overlooked in the rush to recoup production lost earlier in February from the rail strike and other factors.

Car and truck manufacturers are said to be boosting March forecasts to the very limit of supply availability. Indications are that March will show substantially higher totals than those previously expected.

More and More Steel . . .

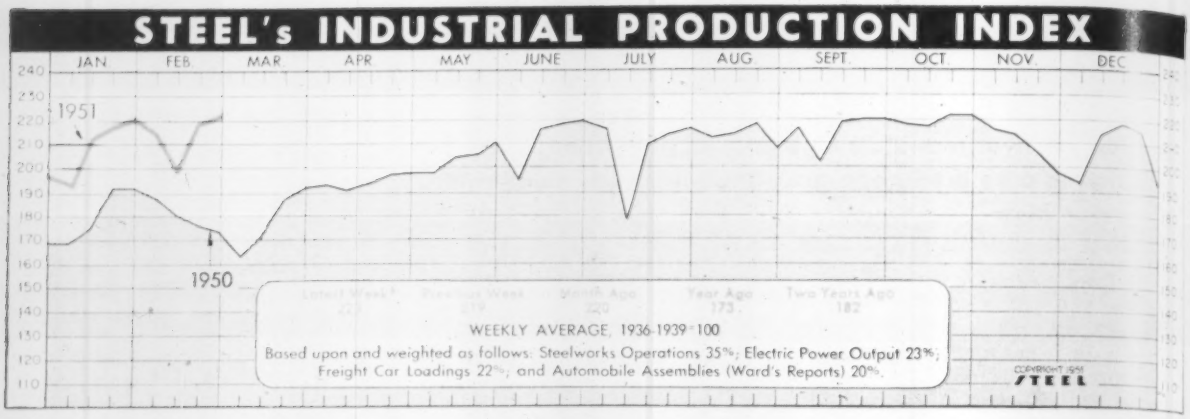
Steel ingot production also continues to rise from the reduced levels of the rail switchmen's strike period. In the week ended Mar. 3 ingot output was expected to get up to 1,995,000 net tons. This level requires operations of approximately theoretical capacity. In the week ended Feb. 24, production was 1,989,000 tons. Before the strike, production reached the alltime record of 2,025,000 tons. The strike dropped it to 1,933,100 tons.

Coaling Up . . .

Production of 10,930,000 net tons of bituminous coal in the week ended Feb. 17 was the largest since the week ended Jan. 27. Output in the week ended Feb. 10 was only 8,445,000 tons. Production this year is about double that of the correspond-

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	99.5	99.0	100.0	85.5
	Electric Power Distributed (million kilowatt hours)	6,833	6,905	6,970	5,854
	Bituminous Coal Production (daily av.—1000 tons)	1,822	1,407	1,862	401
	Petroleum Production (daily av.—1000 bbl)	5,945	5,937	6,606	5,000
	Construction Volume (ENR—Unit $1,000,000)	$223.8	$256.5	$305.3	$263.6
	Automobile and Truck Output (Ward's—number units)	192,243	177,932	167,869	125,285
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,635; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	735†	741	784	547
	Business Failures (Dun & Bradstreet, number)	127	165	193	210
	Currency in Circulation (in millions of dollars)‡	$27,164	$27,159	$27,028	$27,019
	Department Store Sales (changes from like wk. a yr. ago)‡	+17%	+15%	+31%	+2%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,976	$13,338	$16,952	$12,693
	Federal Gross Debt (billions)	$256.0	$256.0	$256.0	$256.5
	Bond Volume, NYSE (millions)	$18.5	$18.4	$27.1	$16.0
	Stocks Sales, NYSE (thousands of shares)	7,817	8,836	12,779	6,316
	Loans and Investments (billions)†	$69.2	$69.2	$70.4	$67.0
	United States Gov't. Obligations Held (millions)†	$30,858	$31,093	$32,634	$36,975
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.13
	STEEL's Nonferrous Metal Price Index‡	262.3	262.3	261.0	159.7
	All Commodities†	183.4	183.4	180.0	153.0
	Metals and Metal Products†	188.7	188.7	188.4	168.8
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
STEEL

ing period of last year, output through Feb. 17 being 73,220,000 tons, compared with only 39,387,000 in the like period of 1950.

Slowdown . . .

Industrial building contracts awarded in the week ended Feb. 22 totaled $69.7 million, *Engineering News-Record* reports. Awards that week for all types of heavy construction declined to $223,777,000 from the preceding week's $256,465,000. Cumulative total of all heavy construction awards for the eight weeks of 1951 is $2,537,957,000, a 58 per cent rise over the corresponding period of last year.

Price Rise Halts . . .

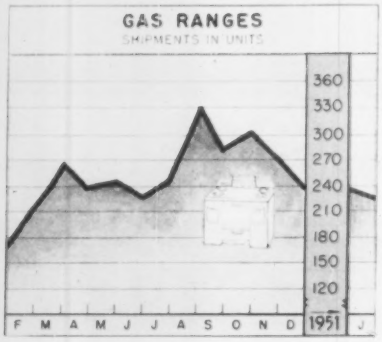
After setting new alltime records for 14 consecutive weeks, the government's wholesale price index leveled off in the week ended Feb. 20 and registered the same as it had in the week ended Feb. 13, 183.4 per cent of the 1926 average.

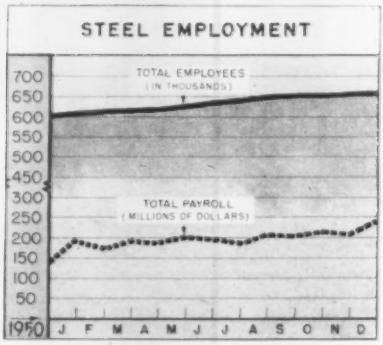
They Buy, Buy and Buy . . .

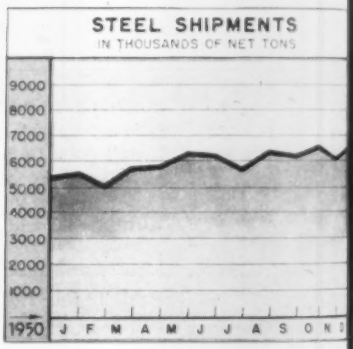
Department store sales continued to register big dollar volume gains over last year. In the week ended Feb. 17 the gain was 17 per cent. Only explanation the Federal Reserve Board could give was "the people are just buying."

Radio, TV Output Weakens . . .

Radio production in January declined 9 per cent and television set output dropped 21 per cent below the monthly average of the fourth quarter of 1950, the Radio-Television Manufacturers Association reports. In January, 1,203,591 radios and 639,499 television sets were turned out. Breakdown of the January radio pro







Gas Ranges
Shipments in Units

	1951	1950	1949
Jan.	225,100	165,000	106,700
Feb.		209,000	117,700
Mar.		264,000	151,500
Apr.		239,100	150,100
May		242,800	151,600
June		217,000	162,200
July		254,800	125,800
Aug.		331,500	206,100
Sept.		287,000	227,300
Oct.		308,000	257,500
Nov.		269,100	237,400
Dec.		237,400	175,700
Total		3,024,700	2,069,600

Gas Appliance Mfrs. Assoc.

Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1950	1949	1950	1949
Jan.	609	650	$189.3	$202.1
Feb.	613	653	174.7	189.8
Mar.	616	652	190.0	207.2
Apr.	621	647	186.2	191.9
May	628	637	199.9	188.4
June	636	625	195.3	181.8
July	643	610	188.7	160.3
Aug.	649	603	206.6	175.6
Sept.	650	600	203.8	173.5
*Oct.	650	584	212.2	63.1
*Nov.	653	584	208.0	63.1
Dec.	657	602	235.0	136.9

† Monthly average. * Averages taken from single figure for the two strike affected months in 1949. American Iron & Steel Institute.

Steel Shipments
Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,42
Feb.	5,134,780	5,519,938	5,046,11
Mar.	5,723,340	6,305,681	5,978,53
Apr.	5,780,453	5,596,786	5,096,16
May	6,252,672	5,234,862	5,321,37
June	6,192,438	5,177,259	5,476,73
July	5,668,898	4,534,855	5,229,88
Aug.	6,326,464	4,918,314	5,329,06
Sept.	6,145,354	5,236,196	5,511,47
Oct.	6,503,531	935,037	5,952,09
Nov.	6,051,145	3,296,809	5,702,29
Dec.	6,432,776	5,410,902	6,056,29

American Iron & Steel Institute

Charts—Copyright 1951, STEEL

duction shows 785,983 home sets, 70,800 portables and 346,799 auto receivers.

Turning Down the Heat . . .

Industry shipments of gas-fired central heating equipment (furnaces, boilers and conversion burners) in January were lower than in any month since February, 1950, but were 56.5 per cent above those in January, 1950. The January, 1951, shipments are estimated at 52,900 units by the Gas Appliance Manufacturers Association Inc. Shipped in January, 1950, were 33,800 units; in December, 63,200 units.

Best Business in 22 Years . . .

Business in January was the best fabricators of structural steel experienced since December, 1929. They booked 285,087 tons, the American Institute of Steel Construction reports. This was a 35 per cent increase over the 1950 monthly average.

Fabricators' shipments in January totaled 171,886 tons. While that figure is slightly below that of December it is 7 per cent greater than the average for 1950.

Their backlog of business is on the upgrade and is higher than at any time in the last year.

New Locomotives Roll On . . .

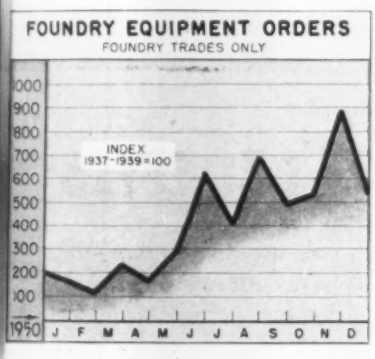
Installation of new locomotives on Class 1 railroads continues to run above the 200 mark per month. In January they totaled 219.

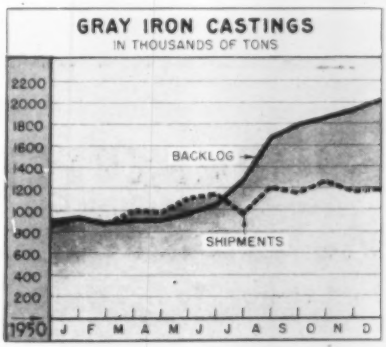
Trends Fore and Aft . . .

The second rush of protective buying since the Korean war began is rapidly receding, the National Association of Purchasing Agents reports. . . . Unfilled orders of the Duraloy Co., Scottdale, Pa., high alloy metal producer, are at the highest level in history, approximately $2 million . . . The $6,476,814 worth of pumps ordered in January is the second highest monthly amount in the last year; high point was December when bookings totaled $6,720,410, says Hydraulic Institute.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction	Feb.5	Ironers	Feb.19	Ranges, Elec.	Feb.5
Durable Goods	Feb.12	Machine Tools	Feb.12	Refrigerators	Jan.15
Fab. Struc. Steel	Feb.12	Malleable Cast.	Feb.5	Steel Castings	Feb.26
Freight Cars	Feb.26	Metalwkg. Employ.	Feb.19	Steel Forgings	Feb.26
Furnaces, Indus.	Feb.26	Price Indexes	Feb.19	Vacuum Cleaners	Feb.19
Furnaces, W. Air.	Jan.22	Pumps, New Orders	Feb.5	Wages, Metalwkg.	Jan.29
Gear Sales	Feb.12	Purchasing Power	Feb.5	Washers	Feb.19
Indus. Production	Feb.12	Radio, TV	Feb.26	Water Heaters	Dec.25





Foundry Equipment Orders

	Index		Value in Thousands	
	1950	1949	1950	1949
Jan.	159.3	149.9	$731	$694
Feb.	113.1	144.4	519	668
Mar.	225.2	190.8	1,034	883
Apr.	160.6	172.0	737	797
May	294.9	121.9	1,353	565
June	622.7	164.9	2,858	764
July	401.8	146.6	1,844	679
Aug.	693.6	127.1	3,183	589
Sept.	483.8	166.6	2,220	772
Oct.	526.8	133.5	2,417	618
Nov.	885.5	270.4	4,077	1,250
Dec.	526.2	201.0	2,423	929

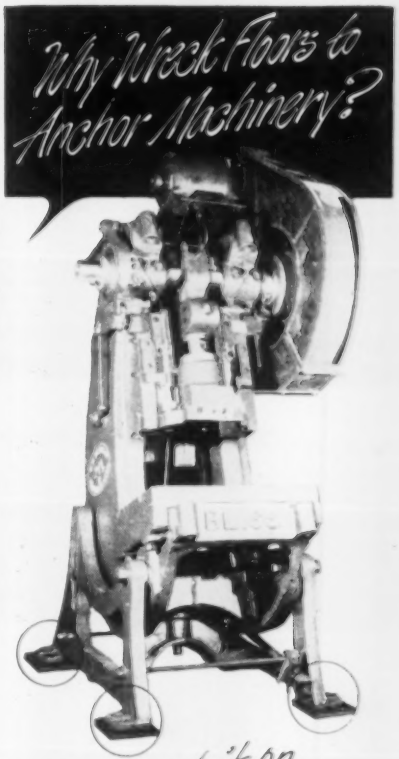
Foundry Equipment Mfrs. Assoc.

Gray Iron Castings

Thousands of Net Tons

	Shipments		Backlogs*	
	1950	1949	1950	1949
Jan.	913	1,040	914	2,065
Feb.	864	987	873	1,857
Mar.	996	1,075	922	1,639
Apr.	981	929	922	1,446
May	1,095	867	978	1,243
June	1,136	906	1,040	1,083
July	961	697	1,287	1,032
Aug.	1,202	872	1,670	1,048
Sept.	1,159	881	1,794	980
Oct.	1,255	716	1,846	955
Nov.	1,161	719	1,930	939
Dec.	1,182	862	2,012	892
Total	12,905	10,551		

*For sale. U. S. Bureau of the Census.



Mount it on UNISORB®

...and Save

Mounting on UNISORB speeds installation . . . requires no bolts or lag screws or hole-drilling. A special cement binds the UNISORB pads to the machine feet and the floor. Permanent set absolutely prevents any riding.

UNISORB absorbs from 60% to 85% of transmitted vibration and noise. This results in substantial reduction of building and machinery repair, maintenance and replacement. This same noise and vibration absorption helps, moreover, toward lowered worker fatigue.

You can use UNISORB with equal effectiveness in anchoring light, medium and heavy machinery of almost every variety . . . *on any type of flooring.*

Wherever you need secure, simple, trouble-free machine mounting, remember: *UNISORB pays by saving all-ways!* Sample on request. Write.

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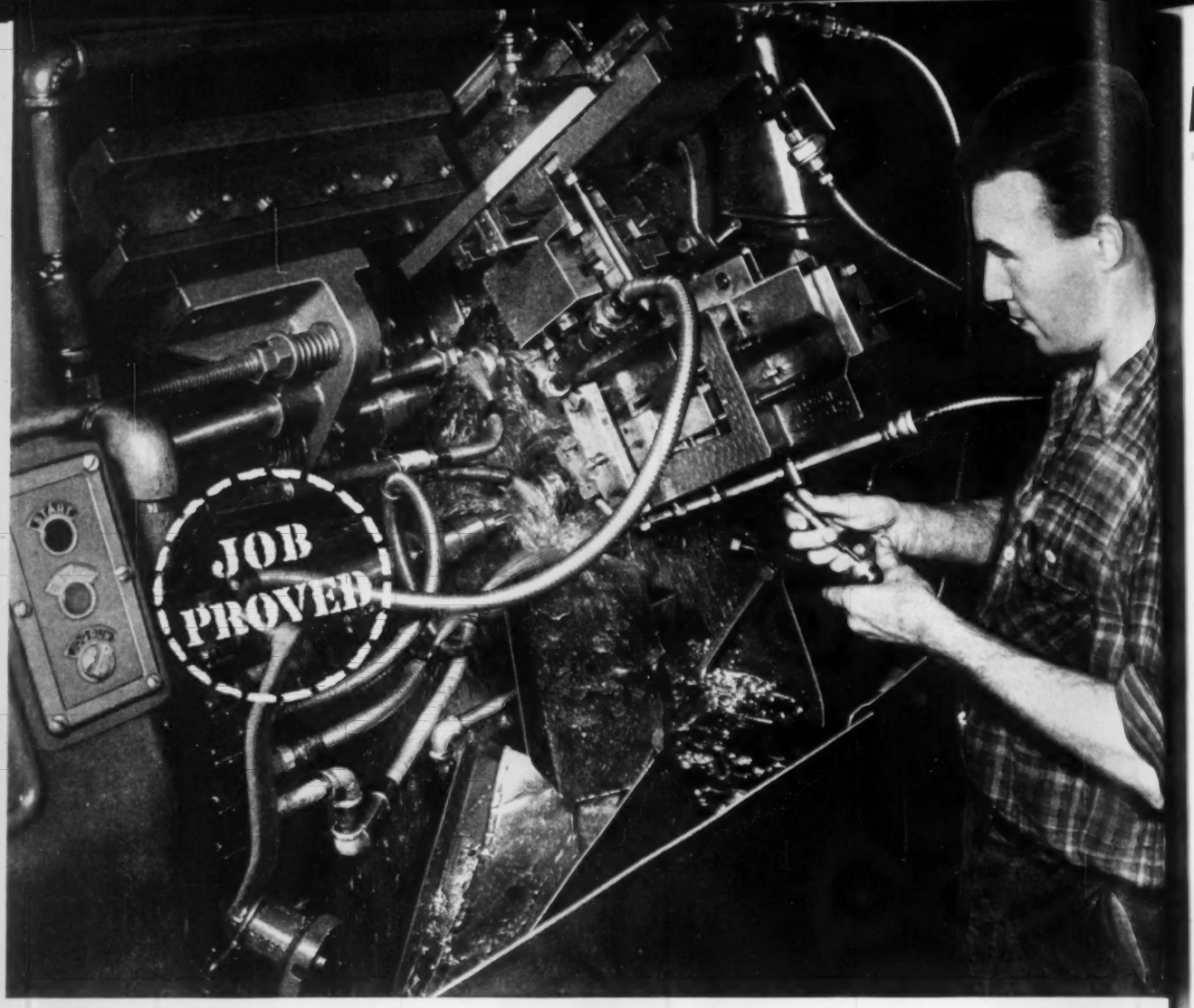
Offices: New York, Philadelphia, Chicago, Detroit, Cleveland, St. Louis

Sales Representatives: San Francisco, Dallas.

Mills: Johnson City, N. Y. Millbury, Mass. Jackson, Mich. New York, N. Y.



SUNICUT DELIVERS UNEXPECTED BENEFITS

Action Taken To Improve Working Conditions Results in Better Finishes, Longer Tool Life

A cutting oil that "fogs" excessively is annoying to operators. Droplets form and drip from overhead. So when this occurred three years ago in a large metalworking plant, the owner lost no time in taking action.

Accepting the advice of a Sun representative, he tried a "Job Proved" Sunicut oil. This ended the annoyance. It did far more besides. Being transparent, Sunicut made it easier for the operators to take micrometer readings on the work. It improved finishes remarkably and increased tool life 25 percent. Recently a switch was made to *new* Sunicut with Petrofac—and results have been even better.

The new Sunicut grades are giving outstanding performance throughout the metalworking industry. They are transparent, nonemulsifying oils with superior metalwetting, antiweld and extreme pressure qualities. For more information write for folder S-3.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd., Toronto and Montreal

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

Men of Industry

EVERETT K. MORGAN
. . . mechanical press line, Danly Machine

MARVIN J. BAIR
. . . Thomas Steel V. P. of sales

JOE HART
. . . div. sales mgr. at Turco Products

Danly Machine Specialties Inc., Chicago, appointed **Everett K. Morgan** general sales manager of its mechanical press line. Mr. Morgan was formerly associated with Giddings & Lewis Machine Tool Co. as vice president in charge of sales and manager of engineering.

A. William Fraser, formerly general European manager, was appointed Midwest sales manager of **Worthington Pump & Machinery Corp.,** Harrison, N. J. He will direct sales of Chicago, St. Paul, Kansas City and St. Louis offices, and will have headquarters in Chicago. **William F. Weinreich** was placed in charge of the corporation's newly acquired Oil City, Pa., plant, and will be assistant to **Austin C. Ross,** vice president in administrative charge of the Oil City and Buffalo plants.

Promotions at **Armco Steel Corp.,** Middletown, O., include: **Earl G. Stegemiller,** elected assistant treasurer; **Robert A. Nunlist,** credit manager; **Robert S. Hayden,** assistant to treasurer; and **John C. Caldwell,** assistant credit manager.

Joseph F. Borda Jr. has left the Iron & Steel Branch, National Security Resources Board, to join the Washington office of **Bundy Tubing Co.,** Detroit. His office is at 1625 I St. N. W.

Donald F. Kittredge was appointed by **National Malleable & Steel Castings Co.,** Cleveland, as manager of sales, railway division, New York. He replaces **Ellsworth H. Sherwood,** recently made assistant vice president of sales, railway division, and transferred to general offices in Cleveland.

Marvin J. Bair was elected vice president in charge of sales for **Thomas Steel Co.,** Warren, O. Associated with the company since 1938, he served for the past year as general manager of sales.

George L. Fenn, secretary and assistant treasurer, **Adamson-United Co.,** Akron, was elected vice president, and **Donald W. Strong,** formerly field representative at Wright Field, Dayton, O., was assigned to temporary duties with **Shibura-United Co.** at Tokyo, Japan. Both concerns are affiliated companies of United Engineering & Foundry Co., Pittsburgh.

John E. Doxsey has joined **American Steel Warehouse Association Inc.,** Cleveland, as assistant to the president. In this newly created post he will specialize in public relations and publicity. He joins his father, **Walter S. Doxsey,** president of the organization.

JOHN E. DOXSEY
. . . Steel Warehouse Assn. asst.

Turco Products Inc., Los Angeles, appointed **Joe Hart** manager of its metal processing sales division. In this capacity he will act as special sales representative and technical adviser to the metal processing and general manufacturing fields. **Dan T. Buist** was appointed national sales director to succeed **Lou H. Moulton,** retired vice president. **Stewart B. Van Dyne** was appointed administrative assistant, and **Dan T. Miller** as co-ordinator of sales, both newly created positions.

George B. Sisley was made production manager, manufacturing division, **Pacific Airmotive Corp.,** Burbank, Calif.

Frederick W. Thomas, formerly general manager of purchases, Worthington Pump & Machinery Corp., has joined **Joy Mfg. Co.,** Pittsburgh, as director of purchases. **George R. Fox,** formerly head of purchasing, is now assistant vice president in charge of the company's plant expansion program.

David C. Pfeiffer was named to design and supervise construction of new power plant facilities for **Lone Star Steel Co.,** Dallas, at its East Texas works.

Joe Mate joined **Dulane Inc.,** River Grove, Ill., as purchasing agent. He was in charge of purchasing at the Washington boulevard division of Motorola Inc., and previously served in a similar capacity with Stewart-Warner Corp.

H. N. May is chief of material for **Consolidated Vultee Aircraft Corp.'s** San Diego, Calif., division. He former-

ly was purchasing agent for the division and is succeeded by **J. C. Buchan.** Mr. May will have charge of both subcontracting and purchasing.

L. H. Hirsch was appointed chief electrical engineer, **Century Electric**

L. H. HIRSCH
chief elec. engineer, Century Electric

Co., St. Louis. He has been with the company, manufacturer of motors and generators, since 1925.

Robert A. Brayton, manager of sales promotion, is under assignment to Japan as representative of **Armco International Corp.,** Middletown, O. He is succeeded by **Eugene R. Blair,** who has been at Armco since 1934 when he joined the Middletown division of the parent company, Armco Steel Corp.

A. G. Postlethwait, for the last 15 years president, National Bank & Trust Co., Erie, Pa., was elected vice president, **Lord Mfg. Co.,** Erie.

Lewis P. Favorite was named manager of **Aluminum Co. of America's** New York district sales office succeeding **Edward B. Wilber,** elected president, American Lumber & Treating Co., Chicago. Mr. Favorite was product manager in charge of the sale of die castings.

Twin Coach Co. appointed the following executives at its aircraft division plant in Cheektowago, N. Y.: **Fred J. Webb,** superintendent of production departments; **James M. Milikin,** superintendent of tool manufacturing; **James J. Mecca,** production manager; **John P. Elliott,** plant engineer; **Henry Banse,** second-shift superintendent; and **Ralph Condon,** assistant purchasing director.

Donald A. Campbell has joined **Eclipse Fuel Engineering Co.,** Rockford, Ill., as vice president in charge of engineering and research. He has most recently been with Affiliated Gas Equipment Inc.

M. A. Straub was appointed sales manager, Norge Heat Division, **Borg-Warner Corp.,** Chicago.

Mercury Mfg. Co., Chicago, elected officers as follows: **Orvis T. Henkle,** chairman of the board; **C. Winslow Henkle,** president and treasurer; **John R. Bensley,** vice president in charge of sales research; **Orvis T. Henkle Jr.,** vice president in charge of sales; **Harold Milz,** vice president in charge of engineering; and **Philip K. McCullough,** vice president in charge of manufacturing.

Kaiser Steel Corp. appointed **William B. Keirn** superintendent of the cold rolling mill and tin plate mill under construction at Fontana, Calif., plant. He supervised construction and oper-

WILLIAM B. KEIRN
. . . Kaiser Steel mill supt.

ation of its cold rolling mill built during 1946 and 1947.

W. I. Colvin was elected a vice president of **Pacific Can Co.,** San Francisco, in charge of the manufacture of equipment.

Jervis B. Webb Co. of California, Los Angeles subsidiary of Jervis B. Webb Co., Detroit, appointed **Eric O. Melmer** as secretary and chief engineer.

Clark Controller Co., Cleveland, appointed **King Christopher** district manager at Los Angeles. He was connected with the Philadelphia district office. **Bruce Harmon** and **W. J. Bergen Jr.** joined the Cleveland district office; **Cloud M. Conklin Jr.,** the Youngstown office; **Dave DeHerder,** the Chicago office; and **John T. Casey** was assigned the Buffalo office. **Burl F. Robertson** goes to Birmingham and **Fred F. Piper Jr.** to Pittsburgh. Arthur B. Sorneborn Co., Detroit area representative, has added **Norman G. Dembroeder** to the Toledo office and **Robert W. Brisky** to the Grand Rapids office.

Ferederick D. Keeler was appointed director of government services for **Volco Brass & Copper Co.,** Kenilworth, N. J.

Edward A. Ledeen was appointed chief engineer, **Federal Steel Warehouse Corp.,** Dayton, O.

Cochrane Corp., Philadelphia, appointed **S. B. Applebaum** as manager of its water treatment division.

Utica Drop Forge & Tool Corp., Utica, N. Y., elected **Charles E. Wilderman** and **Daniel E. Waterbury** as vice presidents. Mr. Wilderman was formerly division manager, and Mr. Waterbury, production control manager.

Russel J. Jones, general purchasing agent, **Chrysler Corp. of Canada Ltd.,** Windsor, Ont., was elected by the corporation's board of directors to fill the company directorate left vacant by the recent death of **C. W. Churchill.**

Robert W. Vachon was appointed advertising manager, **McCulloch Motors Corp.,** Los Angeles.

Alan W. Abeggien was appointed to the sales force of the Beaver Falls, Pa., district sales office of **Babcock & Wilcox Tube Co.**

W. A. Morton was elected president of **Loftus Engineering Corp.,** Pitts-

W. A. MORTON
. . . Loftus Engineering president

burgh, to succeed the late **Fred H. Loftus.** He joined the company a year and a half ago, and previously was president, Amsler-Morton Co., for some 20 years. He is patentee of

M. S. RAMSEY
. . . new president, Moto-Mower Co.

V. R. PEIFFER
. . . div. production dir., Clinton Machine

HAROLD S. SIZER
. . . directs tool design, Brown & Sharpe

various types of heavy duty furnaces used in the steel industry.

M. S. Ramsey was elected president, **Moto-Mower Co.,** Detroit. He was vice president and general manager. **Henry A. Fielding** was elected vice president and treasurer. He has been secretary since 1936.

Fred C. Poppe is advertising manager, Philadelphia Division, **Yale & Towne Mfg. Co.**

Sheldon Dale was appointed director of research and development, **Cory Corp.,** Chicago.

Anthony J. Zino Jr. was appointed assistant to the president, **Swan-Finch Oil Corp.,** New York. He was sales promotion manager and chief lubrication sales engineer.

Lockheed Aircraft Corp., Burbank, Calif., appointed **Ned Root** publicity manager, and **Richard Bean** assistant, replacing **John L. Tower** and **Ray Conners,** resigned.

V. R. Peiffer was appointed director of production, Warner Division, **Clinton Machine Co.,** Detroit. Before joining Warner he was assistant plant manager at Bowen Products Corp.

Peter Christiansen will succeed **Chester O. Porterfield** on Mar. 15 as purchasing agent of **Lloyd Mfg. Co.,** Menominee, Mich.

Fred A. Locke was appointed assistant general superintendent of the Braeburn, Pa., plant of **Braeburn Alloy Steel Corp.**

John T. Monahan was appointed assistant sales manager, safety products division, **American Optical Co.,** Southbridge, Mass. Since 1948 he has been manager, respirator and specialty sales.

Link-Belt Co., Chicago, appointed **Thomas Cornils** chief engineer, Pacific Northwestern division, with headquarters in Seattle. He succeeds **Homer J. Foye,** now chief engineer in Los Angeles.

Brown & Sharpe Mfg. Co., Providence, R. I., appointed **Harold S. Sizer** director of design for machine tools. He assumes charge of engineering on machine tools and related items.

Changes in the sales organization of **Dearborn Chemical Co.,** Chicago, include two new managers for its eastern division: **C. S. White** is head of water treatment department replacing **S. H. Opdyke,** retired, and **Howard E. Johnston** is manager of No-Ox-Id sales, replacing the late **C. A. Remsen.** Other retirements, effective Jan. 1, include **C. I. Loudenback,** Chicago, **M. M. Kutzer,** Chicago, and **B. E. Conley,** Texas. **R. O. Benson,** Chicago representative, succeeds Mr. White as sales representative in the Iowa territory. **C. R. Oller,** formerly with Dearborn, has returned to the San Francisco office. **C. C. Dennis** was transferred from Indianapolis to the Chicago staff replacing **Vincent P. Nobile,** assigned the New Jersey territory. Another addition to the Chicago staff is **Paul E. France,** formerly with General Chemical Co.

OBITUARIES . . .

Fred M. Zeder, 64, vice chairman of the board of **Chrysler Corp.,** Detroit, died of a heart attack in Miami, Fla., Feb. 24. Mr. Zeder also was vice president in charge of engineering.

Glenn W. Christopher, 64, manager of standard pipe sales, **Youngstown Sheet & Tube Co.,** Youngstown, died Feb. 13.

Victor T. Stulpin, 59, treasurer and production manager, **Paramount Fabricating Co.,** Detroit, died Feb. 16.

Harry Freedman, founder of **Woodmere Scrap Iron & Metal Co.,** Detroit, died Feb. 24.

Nic Krump, 76, original partner in the firm of **Dreis & Krump Mfg. Co.,** Chicago, died Feb. 17.

Walter C. Rockenshire Sr., 54, assistant plant manager for production at Schenectady, N. Y., for **American Locomotive Co.,** died Feb. 22. He was with the company 37 years.

John A. Sherry, 52, regional sales manager, **Perfect Circle Corp.,** Hagerstown, Ind., died Feb. 20 after a long illness. His headquarters were in Indianapolis.

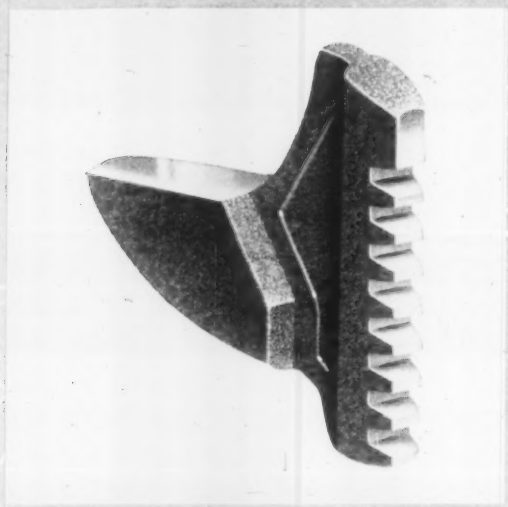
Frederick von Schlegell, 77, engineer and inventor, died in Pasadena, Calif., Feb. 16. He held basic patents on an electric furnace, oil tools and farm equipment.

Leo R. Meyer, 65, president, **Inter-State Foundry Co. Inc.,** Indianapolis, died recently.

Earl L. Kremer, associate in the **Lake City Malleable Co.,** Cleveland, died Feb. 9.

John Doty, 72, vice president and works superintendent, **Lake Erie Engineering Corp.,** Tonawanda, N. Y., died Feb. 18.

Lower Cost-per-piece:



BROACHING *saves* $2112.00 *Monthly*

. . . *cuts manpower needs* 75%

DETROIT BROACH CAN CUT YOUR COST-PER-PIECE

by

1 Developing broaching set-ups to replace other, more costly machining methods.

2 Re-design present broaches and broaching set-ups to make them more efficient.

Two milling machines and two operators per shift, two shifts a day, were required to produce the rack teeth and finish the jaw face on 8000 movable wrench jaw forgings. The Detroit Broach set-up which has replaced the milling operations produces the same number of parts with one operator, one machine, on one shift per day . . . savings in labor alone amount to $2112.00 monthly! And that's not all.

The original tool cost for the broaching set-up was lower and the cost of tool maintenance is reduced materially. In respect to quality, the manufacturer reports much better surface finish, more consistent dimensions, uniformity of parts.

If you are boring, slotting, reaming or milling *your* parts, chances are that Detroit Broach can reduce your cost-per-piece. Why not investigate today? Detroit Broach engineers will gladly discuss your operations and give you actual cost and production data on broaching them.

DETROIT BROACH COMPANY

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Production AND Engineering NEWS AT A GLANCE

LUBRICATE WITH WAX— A leading manufacturer of household waxes has been digging into possible applications in metalworking and finding surprising success. Tests showed special wax blends permitted drawing stainless steel blanks well beyond their theoretical limit, with insignificant tool wear. Another possibility is their substitution for the copper flash on stainless steel wire in cold heading. Wax can be applied by dipping the wire or as a base in the die box. Still another: Coating of self-tapping sheet metal screws reduced torque by as much as 50 per cent. And again: Wax lubricant on hard alloy aircraft tubing reduced bending pressure from 4 to 2½ tons, with fewer rejects from crimping and buckling.

SPEEDING AIRFRAME OUTPUT— Research into the hot forming of aluminum alloy extrusions as a means of speeding up aircraft fabricating operations, undertaken during the war years, is paying off handsomely now (p. 84) as a standard production method. Stock is soaked in 300-degree oil up to one hour maximum and immediately transferred to a press which has dies heated to the temperature of the aluminum to avoid chilling. The result? One man-hour accomplishes forming operations which used to take 60 man-hours.

DIFFUSION ALLOYING— Novel surface hardening process for steel is reported from England. The part to be treated is first subjected to a diffusion treatment in a salt bath containing, for example, anhydrous sodium tungstate in an atmosphere of hydrogen. This produces a tungsten surface content of 10-15 per cent. Titanium, vanadium, columbium, tantalum, chromium or molybdenum layers can be produced similarly. The part thus pretreated then is carburized in a suitable gas atmosphere which, by diffusion, produces within the original layer a hard intermetallic phase.

YESTERDAY A CURIOSITY— The wonderful silicones are finding so many new applications it is just about impossible to keep up with them. For example, one of the latest (p. 87) is a mold release agent used in conjunction with the shell molding process. It is a solvent dispersion of a silicone compound. Oils and greases of the silicone type are common in many industrial plants, while the resinous silicones for insulation materials make possible important weight savings in electrical equipment. And, of course, that bouncing putty the kids buy in the dime stores is—(you know what).

BEADS CHECK SIEVES— A simple and rapid method for determining the effective opening size of metal testing sieves, worked out by two engineers with the National Bureau of Standards, makes use of calibrated glass spheres of graduated size. Glass beads of the type used for highway markings are the source of spheres from 80 to 1000 microns in diameter, corresponding to U. S. sieves No. 170 through 18. Separation of the truly spherical beads from the others is done by allowing them to fall on a slowly rotating disk set at a slight angle to the horizontal and applying a gentle blast of air to start them rolling. The good ones travel quickly in a fairly straight path to the edge of the disk. Sphere sizes are calibrated by actually measuring the diameters of selected samples from projections on a screen.

DIES CAN TAKE IT—Batting out 421¼ million small stampings in 42 months means a lot of punishment for a set of progressive dies operating in high-speed presses at 600-800 strokes a minute. That's the record hung up by one all-carbide installation which is still going strong (p. 80). Complete regrinds are required only once every eight months.

AUTOMATION IN SALT— Fully mechanized electric salt bath installation in a Cleveland plant heat treats cast iron cylinder liners at a rate of 35 to 75 an hour depending upon size and weight. The setup involves four Ajax immersed-electrode heated salt baths arranged in a line, first being a preheat neutral salt bath operating at 1200° F, then a high heat bath held at 1550° and finally a separate quench and draw bath maintained at 450° to 550°. A synchronized conveyor system about 30 feet long automatically transfers the liners to and from each bath at preset intervals and returns them washed and rinsed to the loading station. Liner sizes range from those with walls as thin as 1/16-inch and weighing less than 3 pounds to some with walls better than ½-inch thick and weighing more than 25 pounds.

—*A.H.A.*

Metalworking Outlook—p. 43 *Market Outlook—p. 151*

15,000,000 STAMPINGS per Grind on C

High-speed presses show less downtime and lower die maintenance despite upped tooling cost. Stock guides, anvils, grip knives also changed to harder material, with pronounced increase in life

INCREASED production, decreased equipment downtime, lower die maintenance costs and better product quality control are all included in gains catalogued from four years' operation of a "carbide program."

Most important of the tooling items now principally made of cemented tungsten carbide are the punch-and-die components used in multiple-station progressive die sets. However, favorable use for this material has been observed in wearproofing other press parts such as feed grip knives and anvils, holddown buttons and pads, and stock guides. In general, wherever the production of a given part warrants the initial investment, dies with carbide inserts and punches are used.

The program was undertaken about four years ago following an experimental tryout period which showed promising results. The promises have been borne out in applying carbides on a broad scale, and the specification of carbides for complete tooling of press dies is approaching routine on long-run parts. Further, in those long-run jobs where steel dies are used, as wear develops, steel parts are replaced with carbide inserts.

Today there are 29 progressive die sets in use in which cemented carbide is used at all stations. Five additional progressive die sets of this type are under construction. These 34 dies alone account for a total of some 550 separate carbide die parts.

In addition to the above "complete" dies, some 71 other existing progressive dies each incorporate from one to nine carbide pieces, a total of close to 200 additional components.

These die parts are called upon to perform all manner of operations—punching, notching, shearing, forming, bending, cutoff and related operations. On multiple-slide presses, carbide parts are also finding new application on accessory tools.

Eight-Month Regrind Period—Since the economy of carbide dies has been definitely established, detail records are no longer being maintained. However, one all-carbide die set, at the last tabulation, had produced approximately 42,250,000 pieces over a 42-month period. Another, put into use a year later, has produced 30,175,000 in 30 months. Both are still in service. Complete regrinds are made about once every eight months, giving about 8 million pieces per grind.

Most carbide dies are found to run between 10 million and 15 million pieces per grind. In general this compares with a normal production of 250,000

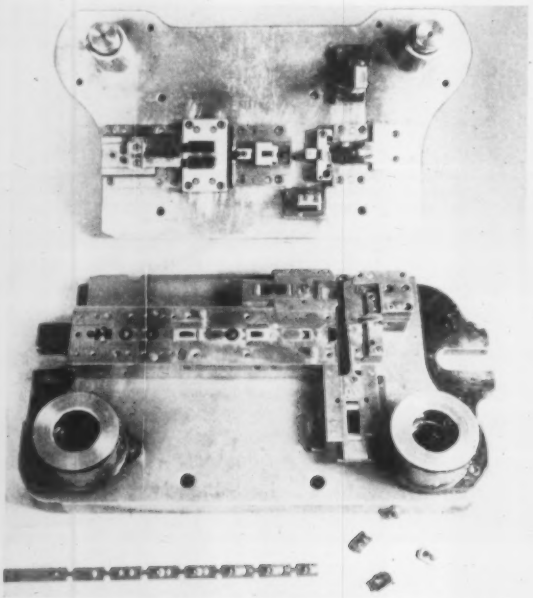
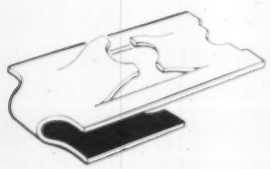


TABLE I
OPERATIONS PERFORMED

Station		Carbide Grade Used, No.* Male Part	Female Part
1	Pierce 0.126-inch hole on axial centerline	190	55B
2	Notch two sides	190(2)	55B
3	Pierce half-moon opening (0.137-inch radius)	190	55B
4	Pierce key-hole	190	55B
5	Shear and form prongs	55A	55B (2)
6	Roll edge on hole made in step 3	190	55B
7	Form helix for threading and swage	190	190
8	Stamp identification	Carbide on stamp, high-speed steel on anvil	
9	Knock down (size) and burr	190	HSS(anvil)
10	Cutoff	55B(knife)	55A (anvil)
11	Wrap around end of piece (form)	Steel	55A

* Furnished by Carboloy Co.



Eleven-station progressive die with carbide inserts at all stations. Above shows the J-type fastener produced, of SAE 1060 steel, 0.040-inch thick and 9/16-inch wide. Die is used in an open-back inclinable press operating at 250 strokes a minute

Carbide Dies

By JOHN E. SPOFFORD JR.
Special Projects Engineer
Tinnerman Products Inc.
Cleveland

to 300,000 pieces per grind with steel dies. Of course there is no fixed ratio as to comparative die life. In some cases carbide die life is only about eight to ten times, in other cases as much as 60 times, that of steel dies.

In the case of forming stations where both male and female components have compound curved surfaces, life of steel is only about 500,000 pieces per grind. Carbide components give close to 5 million. Thus, while the initial cost of the carbide dies is higher, the cost per piece produced is far less, considering increased production per machine, decreased downtime and lower die maintenance cost.

This point might be mentioned in connection with die life. While the comparative life may vary with the material gage and character, type of die, etc., the productivity per grind is usually consistent.

As to reconditioning cost, there is little difference in regrind time between carbide and steel. For example, it takes about 5 hours to do a complete reconditioning job on either steel or carbide dies of the 14-station progressive type.

Occasional accidents do occur, of course, necessitating removal of the die for repair or replacement of damaged inserts but such damage is no greater with carbide than with steel. Such infrequent trouble may result from improper setup, air failure, inattention of the operator, or similar reasons.

Die Components Standardized—In general, the approach to the use of carbide is to use existing die design and simply substitute carbide punches and die inserts. This has proved satisfactory and has worked out well with the program of standardization of die components over the past several years. As a result it is possible to stock various die components in either steel or carbide for assembly into dies as required.

Moreover, where a certain product is discontinued, it is the practice to remove the standard carbide parts from the dies, return them to stock and re-use them later in other dies so that product obsolescence does not affect ability to utilize carbides to their maximum effectiveness.

Use of carbide dies has practically eliminated rejects for marred surface finish on parts blanked. When using steel dies at 600 to 800 strokes per minute, the speed of some presses, the amount of scrapped parts can be high if the inspector does not anticipate or notice when the die starts to wear beyond a point of required standard. This seldom happens with carbide dies since grind life is far longer and can be forecast accurately. In fact, regrinds on carbide generally constitute preventive maintenance.

A few case histories are fairly representative of the die practice and experience:

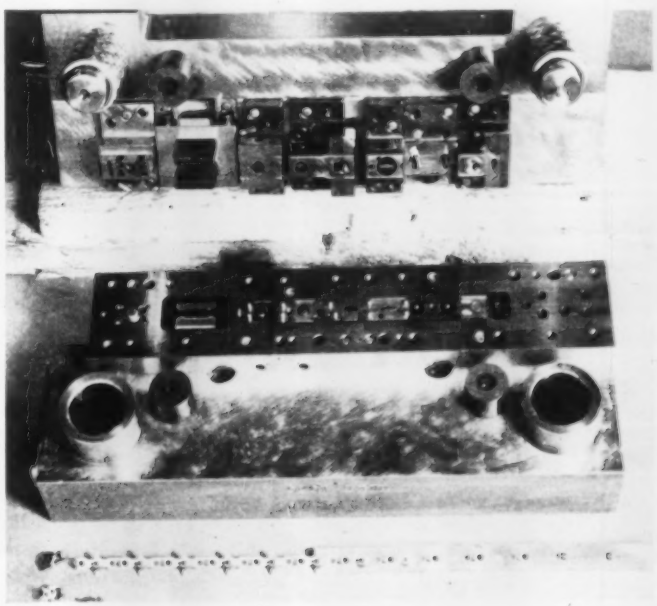
No. 1—Dies for J-type Speed Nut

This is a blind fastener for a metal panel assembly. The die uses carbide at all stations. Stock is SAE

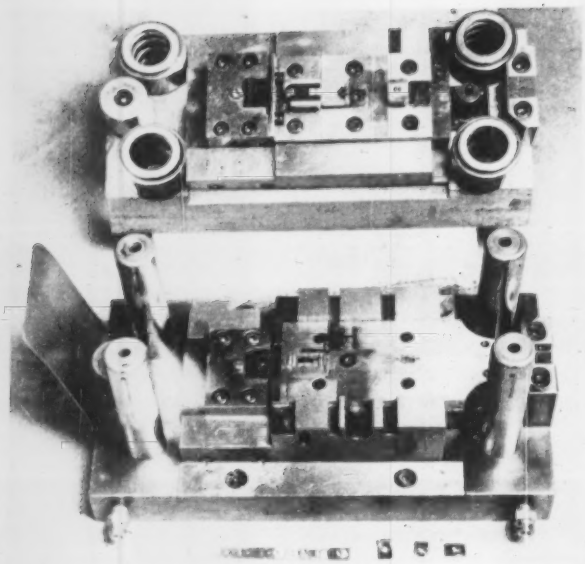
TABLE II
OPERATIONS PERFORMED

Station		Carbide Grade Used, No.* Male Part	Female Part
1	Idle		
2	Idle		
3	Pierce horseshoe opening	55B	55B
4	Idle		
5	Pierce round hole	55B	55B
6	Pierce round hole	55B	55B
7	Shear and form	55A	55A
8	Slit tongue	55A	55A
9	Stamp identification	Carbide on stamp, high-speed steel on anvil	
10	Swage dome and form helix	190	190
11	Tension form two prongs upward	190	190
12	Form tab	190	HSS(anvil)
13	Notch (2) side contours	55B	55B
14	Form (4) side hooks	190	190

* Furnished by Carboloy Co.



Fourteen-station (three idle) die set which progressively forms the clip sketched above. Carbide at all stations has yielded production of nearly 50 million pieces in two years of service, with only three regrinds

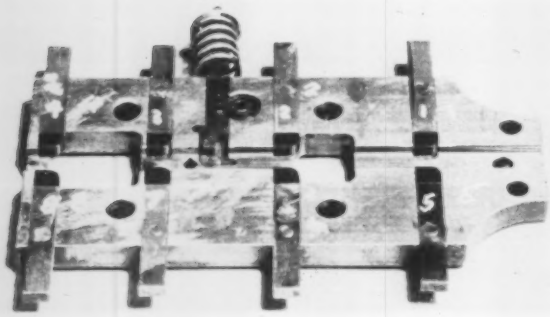


Typical four-station die fitted with carbide and turning out the flat-type fastener shown. It is operated in a straight-sided press running up to 750 strokes a minute

1060 steel, 0.040-inch thick and 9/16-inch wide. Feed and blank length is 1.506 inches. The die is on an open-back inclinable press operating at a speed of about 250 strokes per minute. Actual productive speed averages somewhat less than this. This particular die has been in use for about 30 months and has produced nearly 50 million pieces with 5 million pieces per grind, approximately. Pieces per grind are about 16:1 for the carbide die set compared with steel. Operations are shown in Table I, and are quite conventional. The punch in station 9, incidentally, has handled nearly 50 million pieces without being reground. The steel punch on previous dies was good for about 1 million pieces.

No. 2—Speed Clips for radio and allied industries:

Again, carbide is used at all stations. Stock is SAE 1050, with widths ranging up to 5/8-inch by 0.011-inch thick. Feed and blank length in all cases is 1.020 inches. The die is in a multiple-slide press having four slides. Production so far with the die set is somewhere between 40 and 50 million pieces. It has had three regrinds in 24 months of service



Carbide tips are copper brazed to the ends of stock guides in this stripper assembly. Wear must be avoided in order to align the stock properly with the tools of the die set

with minor touchups between regrinds. Average is therefore around 10-15 million pieces per grind or about 40 to 60 times that obtained with former steel dies of the same design. Operations are given in Table II.

No. 3—Flat-type Speed Nut

This is one of a number of similar four-station progressive dies with carbide at all stations. The stock is SAE 1060, and is 13/32-inch wide by 0.028-inch thick. Feed and blank length is 0.632-inch. The die set is used in a straight-sided press with an operating speed of around 750 strokes per minute; average is around 600 strokes a minute. Carbide grades used for this type of die are generally 55A and 55B. Since this type of fastener is one of the largest-volume items, die costs were checked pretty closely when carbide was first tried. Tool maintenance cost was cut to about a third, and a substantial increase in average hourly production was being realized. The final study of a prolonged run on each die showed an average gain of around 7000 extra pieces per hour.

Of particular interest in this die set, perhaps, may be the use of carbide tips copper brazed to the ends of the stock guides in the stripper assembly, illustrated herewith. These eight guides are adjustable, and BC (before carbide) wore rapidly. When this happened they could not align the stock properly with the tools and would sometimes raise a burr on the edge of the stock.

No. 4—Flat-type Speed Nut

This die is similar to that in Case No. 3 above, it will be noted. The major differences are dimensional. Operating speed of the straight-sided press in which the die set is used is well above 700 strokes per minute. Total production with the set is around 42,250,000 pieces, with five regrinds. It is still in service. Carbide inserts are used in a number of places in the feed mechanism on this press, incidentally.

All multiple-slide presses at this plant are equipped with carbide insert stock guides. The size of the insert varies with the thickness of the coiled strip stock used on the particular press, the guides being adjustable to compensate for various widths.

Before using these slide-type guides, roller guides were the rule. Their difficulty was that the instant a roller stopped turning, the stock, fed on edge from horizontal reels, would wear a deep slot into the roller; after that the roller was useless. It would not turn, would mar the surface of the stock and impede its motion. Some steel rollers lasted several months, some only a few days.

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

BALANCING SCHOOL: As a result of my "Heavy Penny" story, page 98, Dec. 4, 1950, STEEL, M. B. Hanks, advertising manager, let me in on a unique adult education project then being whipped into shape by Gisholt Machine Co., Madison, Wis.

I have just received a formal announcement which opens up as follows: "The balancing machine is a relatively new production tool. Theory and practice of balancing parts daily confronts design engineers, tool engineers, production men and maintenance men. Unfortunately, information required by those men is not available in textbooks or in other printed material. Gisholt Machine Co. now offers a balancing school to give these men the information they need."

And now for some facts about this school, its requirements and its curriculum. The "campus" will be the Gisholt plant in Madison. A hotel will serve as the "dormitory." Theory and practice will be taught by a group of qualified Gisholt "professors" who will conduct classes, discussions and practice sessions in the engineering building conference room, in the balancing machine laboratory, on the test floor in the assembly department.

Students should bring both "white collar" and shop clothing. There will be work for hands as well as heads. Classes, limited to eight men each, will begin late in March or early in April, at which time a textbook, especially written, will be ready.

The preferred student is a keyman in your organization, one whose loyalty to the U. S. A. has been certified. He should be between 25 and 45 years of age, at least a high school or trade school graduate with two years of mathematics and science, plus drafting, shop trigonometry and machine shop practice. Bachelor of Science degree in mechanical engineering will be helpful, though not mandatory.

Students must be enrolled by their respective companies, who will pay the tuition, students' salaries, their transportation to and from Madison and all expenses while students are in Madison. There are two separate courses. Type S runs for two weeks (80 hours of instruction), tuition being $100. Type U runs for three weeks (100 hours of instruction) and costs $150. They do not run concurrently. However, special arrangements can be made for students who wish to take both courses without duplicating work common to both.

If you—as a manufacturer of things that revolve—want to get a keyman in on the ground floor of this novel and useful "engineering school," I urge that you immediately communicate with Gisholt.

MEN, MACHINES AND MOUNTAINS: This week I have journeyed back to my old stamping ground in northern New England. I have been drafted to tell members of Twin State Chapter, American Society of Tool Engineers, some of the stories behind the history of the machinery industries of Springfield and Windsor, Vt., and Claremont, N. H.

It always has been a mystery to the uninitiated, why—for well over 100 years—an unending stream of machine tools, cutting tools, mining and quarrying machinery and related industrial products has been pouring out of three small communities tucked away in the hills so far from raw material sources and so far from big industrial centers. Having been born and brought up there, it is no particular mystery to me. After all, the Swiss also are doing right well at machine tool building, as well as watchmaking, in a land far more rugged and fully as isolated.

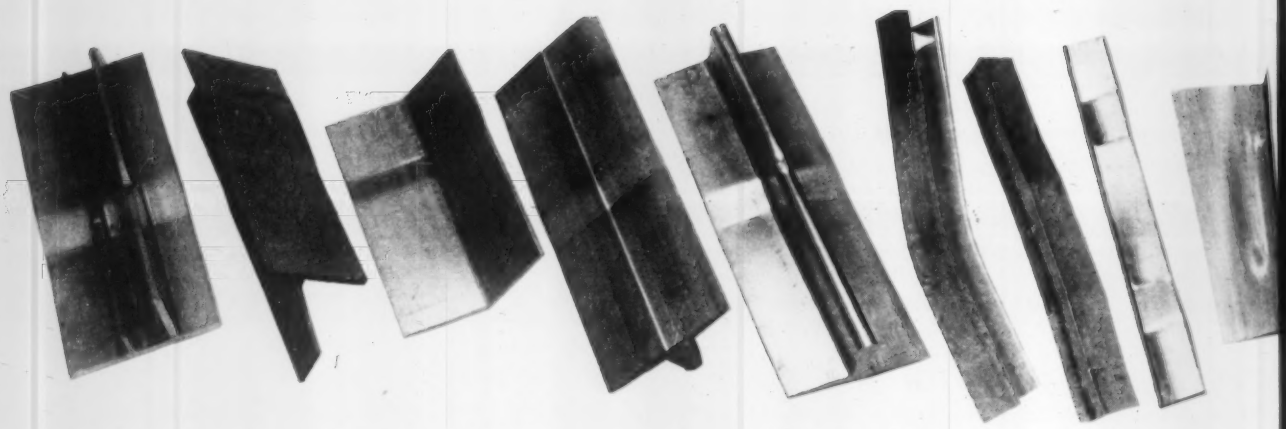
It all simmers down to this. If a "more-than-local" metalworking industry does manage to get a foothold in a rustic community of hardworking people who have a reasonable amount of native skill and ingenuity, the "big shop" very soon becomes a much more attractive and profitable place to work than any hill farm or any small village enterprise. Also, the possibility of "getting somewhere" by way of the big shop are far beyond anything else that the town has to offer—even through apprenticeship in a local newspaper office or country lawyer's office.

James Hartness became governor of Vermont, and Ralph Flanders United States senator, by way of Jones & Lamson Machine Co. Just recently, Joseph Johnson, formerly general manager, Bryant Chucking Grinder Co., was elected lieutenant governor of Vermont. Many others who have chosen to remain associated with these and other Vermont and New Hampshire machinery enterprises, have been sent to the far corners of the earth. They have sent back orders which have "kept the home wheels turning" even in times of depression.

As compared to conditions involved with similar industries in big cities, I would say that up there in the hills there is a bit more peace-of-mind, which encourages constructive thinking and invention; a bit more individual responsibility in a community enterprise, which makes for a more honest day's work more days in the year; a bit more time "after hours" to enjoy fresh air and sunshine because the "big shop" is right near home. A psalmist caught the idea in these words, "I lift up my eyes to the hills whence cometh my strength."

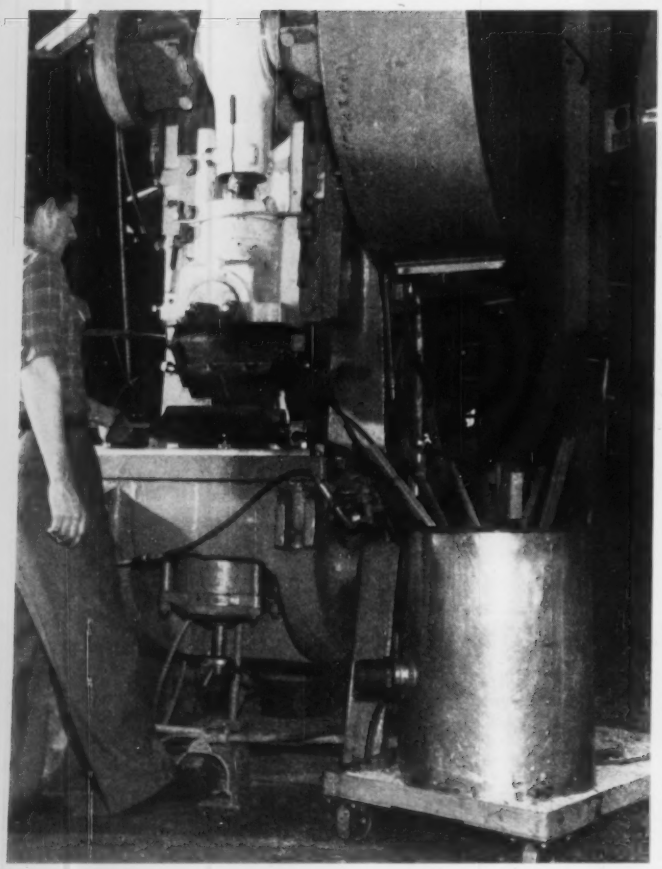
CURBING EARTHQUAKES: In 1862, Charles E. Billings started up a battery of small drop hammers in Utica, N. Y., forging frames for cavalry pistols. Enraged citizens—jarred by man-made earthquakes—stopped the hammers. A telegram from Abraham Lincoln very promptly set them going again.

Harry Showalter, Gerard Associates, Chambersburg, Pa., tells me that "spring isolation" now makes impact machines good neighbors even to "nervous" precision grinders. So I have a date to learn the details from Donald Vance, Korfund Co., during the ASTE convention in New York.



Aluminum Aircraft Parts Hot Formed

Northrop Aviation uses production line hot forming techniques to fabricate 75S aluminum alloy airframe components in a fraction of the time formerly required. Oil bath immersion and electrical resistance are the two heating methods employed



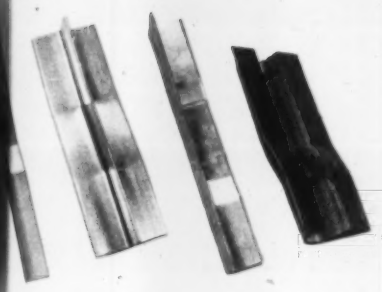
Forming 75S-T6 aluminum alloy on a mechanical punch press. Portable oil immersion heating tank is at right

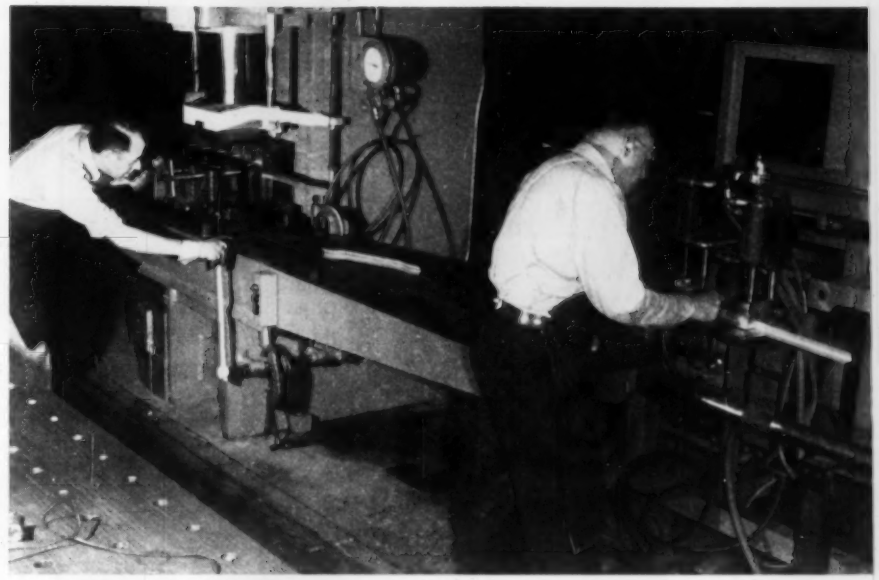
HOT FORMING of high strength aluminum alloys is replacing cold forming and subsequent heat treating and straightening in many applications at Northrop Aviation's Hawthorne, Calif., plant. Efficiency of the process is demonstrated by the fact that one man-hour is required for hot forming 20 parts whose fabrication formerly consumed 60 man-hours.

During World War II, several aircraft plants conducted research in hot forming various aluminum and magnesium alloys. While in many cases results were encouraging, little was done to adapt the new techniques to production. When Northrop Aircraft Inc. received the contract for construction of the XB-35 Flying Wing, extensive use of 75S material in the project caused company metallurgical engineers to reopen the investigations relative to hot forming and adapt the knowledge thus gained to production techniques.

New hot forming techniques were adapted to production in the order of their occurrence and as soon as it was established that they were practical. As a result of this approach, more than 200 75S alloy parts used in the B-35 were being hot formed before the last airplane was built. The research work continued after expiration of the contract, and today hot forming of the 75S materials, especially of extrusions, is an important function on the Northrop production line.

An important technical problem involved in hot forming is maintenance of a critical temperature range. For 75S-T6 material, a forming temperature of 300° F produces best results and has no appreciable effect on the strength. At 400° F, serious overaging takes place. When heated at 300° F, the formability of 75S-T6 compares favorably with that





ed Successfully

By GILBERT C. CLOSE

Above—Electrical resistance heating unit, right, is located near press, left, to facilitate quick transfer of heated parts to be formed

Above left—Typical joggles in aluminum extrusion hot formed at 275-300° F. Springback allowance is 35 per cent

of 75S-O at room temperature, especially in such operations as stretch-forming, bending and joggling.

This critical temperature range makes it difficult to use conventional furnace heating methods. Furnace heating time is long, and handling methods are awkward. The two methods selected, used and proved by Northrop engineers are oil bath immersion heating and electrical resistance heating.

Oil Bath Immersion Heating—Approximately 75 per cent of all 75S-T6 parts being formed or joggled in the Northrop shops today are heated by the oil bath immersion process. Two specially constructed and portable gas-fired oil bath tanks are used for this work.

Soaking time at 300° F temperature proved to be noncritical. In a representative test, material of 0.063 and 0.125-inch thickness was held at 300° F for 4 hours, and the greatest loss of strength noted was 4000 psi, still some 6000 psi above minimum specifications. But since some loss of physical properties did occur, 1 hour was established as the maximum soaking time for any material regardless of gage or thickness.

Circular test bars with thermometer inserts were used to determine the time required for parts of different thicknesses to reach proper forming temperature. These results, based on cross-sectional area, are shown graphically.

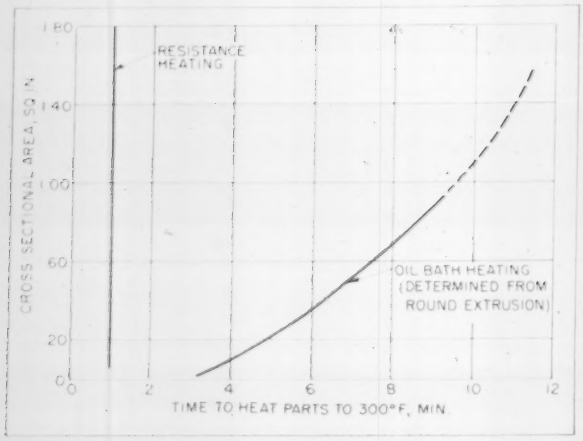
Effect of soaking time on springback was determined by placing a number of parts in the oil bath, bringing them to the correct forming temperature, then removing them at 5-minute intervals and forming immediately using 75 tons of pressure. Variations in joggle depths thus obtained did not exceed 0.006-inch. Normal springback averaged about 35 per cent. Thus a recommendation for a nominal springback allowance of 35 per cent of the required joggle depth for the first tool proving operation was made.

Observation and data gathered during this phase of the investigation made it possible to set up process production controls for hot forming using the oil bath immersion method. Controls now in use are:

1. Temperature of the oil bath must be within plus-or minus 10° of 300° F.
2. Minimum specified soaking time must be observed to assure through heating of the metal. A maximum soaking time of 1 hour must not be exceeded.
3. The forming tools employed must be heated to 300° F plus-or-minus 25° F to prevent chilling of the hot work when it comes into contact with the tool.
4. A minimum of time shall be used in transferring the parts from the bath to the forming tool. Part temperature at the instant of forming shall not be below 275° F.
5. Following forming, the inspection department shall conduct hardness tests on the heated area to detect possible overaging.

During these tests parts heated more quickly and evenly if the oil bath was constantly agitated. It was evident that oil bath heaters for production use would be more efficient if provided with some means to keep the oil in constant circulation.

Electrical Resistance Heating — Concurrent with the development of oil bath heating, the possibilities of using electrical resistance heating were also investigated. Equipment used in forming consisted of a



Comparative heating times between oil bath immersion and electrical resistance heating. With electrical resistance heating, heating time can be standardized. In the oil immersion method, time varies with cross-sectional area. Northrop Aircraft Inc. photos

Farquhar hydraulic press, a Hufford stretch-press, and various mechanical punch presses. The electrical heating units employed were reconstructed spotwelders capable of handling sufficient current to do the work. These heating units were portable so that they could be moved from press to press as the work progressed.

Early results showed that 30 kva single-phase alternating current resistance heating equipment was highly practical. These machines are provided with six tap settings on the transformer to permit the use of from 5½ to 15 v used in conjunction with a phase shift control that permits operation at from 20 to 100 per cent of capacity. A 3-inch bus bar conducts the current to the contact points, and though C-clamps are currently used for contact point pressure, the use of hydraulically operated clamps is being investigated.

By using various taps and heat control settings, heating time could be standardized at about 1 minute. For the general run of parts requiring a distance of from 12 to 25 inches between contact points, tap No. 1 or No. 2 could be used, and by varying the machine capacity between 20 and 100 per cent, the 1-minute standard heating time was sufficient.

Factors affecting uniformity of heating:

1. Proper location of the extrusion in relation to the magnetic field is important. While extrusions of various shapes tend to heat evenly unless the flange extremities are very thin, location of the thickest part of the extrusion within the greatest intensity assures even heating. Best possible location of new-run parts can be determined after a few tests.
2. Parts heated by the electrical resistance method must be of constant cross-section throughout the heated area. Parts of uneven cross-section are best heated by the oil immersion method.
3. Clean contact areas are necessary to prevent arcing. All paint, dirt, oil and grease must be removed by polishing with a fine emery paper.
4. A firm and positive connection between the part and the contact points must be procured. Pressure of this contact should be about 1000 psi. Lesser pressures or bridging through the contact area may cause arcing.

In any comparison of the oil immersion and electrical resistance methods of heating, shape of the part is the first consideration. While electrical resistance heating is inherently cleaner and faster, it cannot be used on parts that vary in cross-sectional area between the contact points.

In electrical resistance heating, the time required to bring the metal to the right forming temperature is a direct function of the cross-sectional area, the area and effect of the inductive loop, the magnitude of current flow, and the power factor. The last two of these functions provide variable control so that heating time can be standardized. In oil immersion heating, the heating time varies with the cross-sectional area and must conform to predetermined minimum intervals.

Tubing Resists Corrosion

Tubing and pipe to handle a variety of oxidizing and reducing corrodents is being produced by Alloy Tube Division, Carpenter Steel Co., Union, N. J. Designated as Carpenter alloys B and C, they are made from strip of the Hastelloy analyses made by Haynes Stellite Division, Union Carbide & Carbon Corp.

Alloy B is characterized by its effective resistance to hydrochloric acid in all concentrations and at all temperatures including boiling. It is also recommended for sulphuric acid at temperatures above 80° C but is not recommended for oxidizing atmospheres.

Because of its chromium content, alloy C will withstand strong oxidizing conditions such as those encountered with nitric acid, free chlorine, aqueous solutions of chlorine and acid solutions of ferric and cupric salts. The alloy will also resist phosphoric acid and is highly resistant to acetic, formic and sulphuric acids. Tubing and pipe made of alloy C are generally recommended for use with hydrochloric acid up to 50° C.

Round tubing, annealed and pickled, in sizes ⅝ through 4½ inches is available. It is full-finished with the weld bead completely removed. Round pipe, schedules 5 and 10, comes in sizes ⅜ through 4 inches I.P.S. while schedule 40 pipe is made in sizes ⅜ through 1 inch I.P.S.

Stud Welding Aids

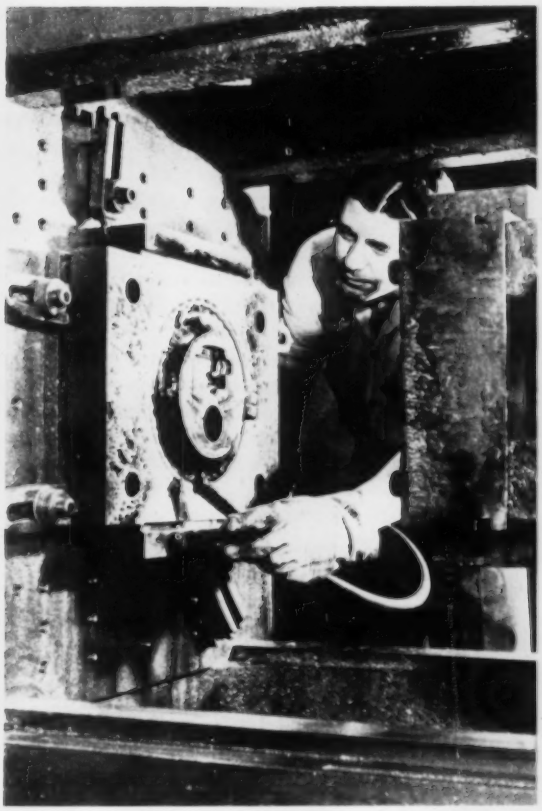
Detailed specifications and performance characteristics of two Nelwelder power units specifically designed to improve and extend the advantages of stud welding are described in a bulletin issued by Nelson Stud Welding Division, Morton Gregory Corp., Lorain, O. One unit gives performance equivalent to two conventional 400-ampere generators in parallel. It can be used to weld studs up to ⅝-inch diameter.

The other unit is battery-powered with a self-contained automatic charging device operated from any 110 v ac utility outlet. It is specially useful in construction work where power required for operating motor driven generators is not available.

Silicones Can Mean

MORE PRODUCTION, LESS MAINTENANCE

Performance of metal parts and equipment functioning under adverse conditions of temperature and stress can be greatly enhanced by use of these semi-inorganic materials in the form of fluids, greases, compounds, resins, varnishes or high temperature paints



Intricate die for casting aluminum parts at Dollin Corp., Newark, N. J., is sprayed with G-E silicone mold lubricant for easier release, elimination of fumes, clean die casting and fewer rejects

SILICONES have grown from laboratory curiosities into industrial materials with numerous uses in metalworking plants in the short span of a few years. All silicones are built on an inherently stable framework of alternate silicon and oxygen atoms, modified by the addition of one or more organic groups to each silicon atom. They are semi-organic materials possessing much of the stability of glass and the other mineral silicates, together with the water repellency and ease of handling usually associated only with organic materials.

Silicones are being produced by Dow Corning Corp., Midland, Mich. and by General Electric Co., in their new plant at Waterford, N. Y. Some of the commercial uses established for silicones are new and specialized; others are as old as hydraulic devices. The deciding factors in the use of silicones in most applications is that they can do things not possible with any other materials now available.

In general, the silicones may be classified into four groups according to their chemical properties: (1) Silicone fluids; (2) grease and compounds; (3) varnishes, resins and high temperature paints; (4) silicone rubbers.

Fluids Stable—The silicone fluids comprise a group of liquid polymers obtainable in a wide viscosity range. They are all characterized by a high degree of heat and oxidation stability; incompatibility with water and many organic solvents; chemical inertness and relative flat viscosity temperature slopes. Silicone fluids have good lubricity under light to medium loads and meet most of the requirements for permanent lubricants for use at abnormally high and low temperatures.

The life of any fluid in a dampening device depends upon its stability and upon its resistance to breakdown under mechanical shearing. Uniform damping action depends upon viscosity-temperature behavior. Among the silicones may be found most desirable damping medium for any device where constancy of performance over a wide temperature range, long service life, and minimum maintenance are worth a somewhat higher initial investment in the fluid.

A torsional vibration damper[1] designed and produced by the Houdaille-Hershey Corp. has demonstrated the usefulness of high viscosity Dow Corning silicone 200 fluids as damping media. The device damps both major and minor critical orders of vibration and requires no tuning. It is reported to be in general use on internal combustion engines ranging in size from automotive engines to locomotive diesels.

Good Dampings, Low Maintenance—Silicone fluids are also now being used in a number of small shock absorbers that must give constant performance over a wide range of temperatures. The pointers of automobile and aircraft instruments are damped with silicone fluids to prevent fluttering and to permit more accurate readings. A minute amount of very high viscosity fluid is applied to the bearings of the pointer spindles in such instruments as gas gages, ammeters, speedometers, and tachometers.

In overload relays, circuit breakers, thermostatic controls, and other devices silicone fluids are used as dashpot liquids. Their use is reported to give uniform and reliable dampings with minimum maintenance.

In sight gages and compasses, silicone fluids are used because of low freezing and high flash points, relative constant viscosity, low vapor pressure and minimum volatility. Another property contributing

to the usefulness of the liquid silicones as hydraulic fluids is that they are good lubricants for most of the more commonly used metals; data have also been published[2] to show that they have the property of compressibility under very high loads and that their flash points and autoignition temperatures are unusually high.

In fluid pressure operated devices, the silicone fluids are exceptionally resistant to shear breakdown and can therefore be used efficiently in more compact hydraulic systems designed to operate under higher pressures. In a magnetic fluid clutch[3] announced recently by the National Bureau of Standards, a mixture of powdered iron and silicone fluid is being tested as a coupling medium between the driving ring and the driven plates. The fluids have found use as liquid dielectrics, especially where high operating temperatures are involved. They are used in capacitors and small transformers because their heat and moisture resistance gives optimum performance and maximum life.

Silicones as Lubricants—The first studies made of the silicone fluids indicated that they had most of the properties required of an ideal lubricant. Heat stability, relative constant viscosity over a wide temperature range, high flash and low freezing points and high oxidation resistance were conspicuous among the first properties that were measured on these new materials.

Dow Corning Corp. points out[4] that just as the physical and chemical properties of silicone fluids are unlike those of petroleum oils, their behavior as lubricants is also different. Over a period of years, bearing metallurgy has been dictated to a large extent by the properties of petroleum oils and greases. Certain metal combinations came into common usage and others were excluded depending upon whether petroleum oils were good or poor lubricants.

Similarly, silicone fluids are good lubricants for certain metal combinations and poor lubricants for others[5]. They cannot be substituted indiscriminately for petroleum oils any more than petroleum oils could have been freely substituted for silicone fluids, if the silicones had been introduced first.

Where rolling friction is involved, silicone fluids have good lubricity and good load-carrying capacity between most of the commonly used metal combinations. This has been shown by very slight wear between steel rolled against steel, even where load units are high. Where sliding friction is involved, and both surfaces are ferrous, Dow Corning research work reports very limited load-carrying capacity and excessive wear. Tests indicate that the silicones are good lubricants in either sliding or rolling friction between plain or chromium-plated high carbon steel and aluminum, copper, copper-lead, brass, bronze or tin base babbitt particularly at elevated temperatures.

Mold Release Agents—In metal die casting, especially zinc and aluminum, the use of silicones gives easy release, improves surface polish, and keeps the dies cleaner longer. G-E cites the following advantages for use of their silicone mold release emulsion in making aluminum and zinc die castings: (1) Reduces break-in time of new molds; (2) decreases down time required for cleaning cores and dies; (3) improves surface quality of die castings; (4) silicone mold release compounds give ready release with very thin films and allow close tolerances to be maintained over long periods of operation. Complicated cores and dies give long service without repair or replacement.

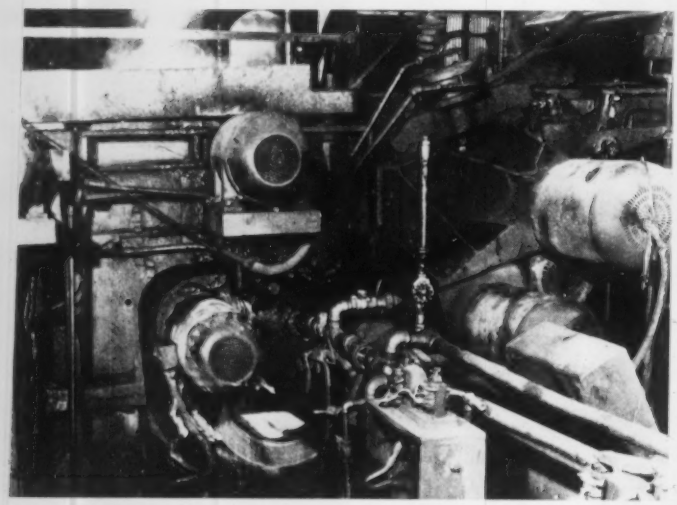
The initial cost of silicone emulsion is relatively high; however, G-E engineers point out that this is more than offset by savings in labor, maintenance and by improved performance. For die castings applications, G-E suggests the use of a 2 per cent silicone emulsion diluted with water. (38 parts water to one part of silicone emulsion) A light pass with a conventional spray device over both parts of the mold before each cycle is the recommended procedure for its use.

Shell Molding Process—A solvent dispersion of a Dow Corning silicone compound is a most effective mold release agent in the shell molding process (Croning or C process) for casting nonferrous parts[7]. At a concentration of 15 per cent by weight in such solvents as methyl ethyl ketone, naphtha or carbon tetrachloride, this silicone compound gives easy release for four or five strippings.

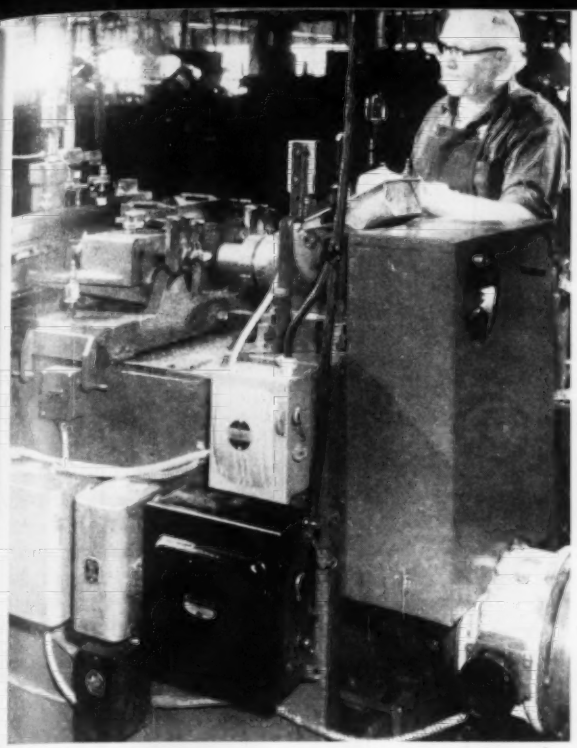
The solvent dispersion is applied by spraying the master pattern. A dry mixture of silica sand and finely powdered phenolformaldehyde resins is then poured against the hot metal pattern. The resin softens, conforms to the shape of the hot pattern and builds up a uniform coating about $\frac{1}{8}$ to $\frac{1}{4}$-inch thick. The pattern plate and the resin bonded sand coating are baked for 1 to 3 minutes at 550° to 600° F. The finished mold is then stripped from the silicone treated pattern through the use of knockout pins.

Rubber gaskets, especially those used to seal refrigerator and automobile doors, are wiped with silicone fluid to prevent sticking to metal surfaces.

Silicone Grease—Dow Corning engineers cite cases[8] where the use of their No. 41 silicone grease has solved production line problems. In this material, a



Silicone-insulated motors still in service after 14 months of exposure to water, steam, high ambients and heavy overloads in steel mill strip coilers. Courtesy United States Steel Co.



This machine is one of four Eaton Mfg. Co. uses at its Saginaw, Mich., plant to bore and face check valve seats for hydraulic valve lifters. Service life of the electric motor, which is stopped abruptly about 105 times an hour by applying direct current to the windings, is reported to be greatly improved by the use of silicone insulation. Photo courtesy Dow Corning Corp.

very finely divided carbon black is used as the thickening agent for a silicone fluid of good lubricity. The grease is reported to have a worked penetration of 260-300; it shows extraordinary resistance to oxidation and thermal decomposition. It is described as having no true dropping point even at temperatures in excess of 400° F.

This unusual material is used in lubricating kiln and oven truck bearings, low speed oven machinery, pumps handling hot liquids and oven conveyor bearings having maximum operating speed factors of 75,000, and at temperatures of from −20° to 400° F. and upwards.

In one plant, a conveyor line carrying freshly painted electrical equipment through a drying oven maintained at 375° F, requires only two greasings a year with silicone grease. Two production problems were solved by the silicone material, namely, burned out conveyor bearings and grease drippings on freshly painted electrical equipment.

At Ford Motor Co., trolley bearings are lubricated with a silicone grease to withstand 700° F in the core oven conveyor system. It is reported that these core ovens operate 16 hours a day, 5 days a week at a peak heat of 700° F. The 7200 trolley bearings are exposed to such temperatures for 2½ hours out of every 4 hours.

Even with automatic oilings, the bearings froze, wheels were flattened, and production was interrupted. With the stable silicone grease, the conveyors require less power to operate. They start easily and run continuously. Replacement and maintenance costs are greatly reduced and the bearings are relubricated only once a week.

Silicone grease is also used to lubricate sealed bearings conveying parts through alkali, Bonderite, chromic acid spray chambers, paint spray booths, as well as the applications in high temperature ovens. Another use[9] is for lubricating roller bearing casters of oven carts loaded with 1000 to 2000 pounds. In this case the carts are wheeled into a 325° F oven for 4-hour periods several times a day; even so the silicone grease is reported to remain serviceable for two to three months.

Another silicone grease compounded of a heat stable silicone oil and lithium soap is used for the lubrication of antifriction bearings operating at speed factors up to 225,000 and at temperatures ranging from −40° F to 350° F. Silicone grease is also used for the bearings of high temperature silicone insulated electric motors.

Although silicone oils and greases are well suited for many applications in the field of extremely high and low temperature lubrication, they were developed for specific uses and are not intended for use where an organic lubricant is satisfactory.

Silicone Resins for Electrical Insulation—The resinous silicones, when used to insulate electric motors, generators, and other equipment offer several advantages because of their stability to heat and resistance to moisture. Advantages cited[10] by Dow Corning are as follows: (1) Greatly prolonged life of equipment operating under adverse service conditions; (2) greater freedom from overload failures and reduced fire hazards; (3) increased horsepower output per unit weight, accomplished through redesigning or rewinding with silicone insulation.

General Electric says their class H silicone insulaton permits continuous operation of electrical machinery at a hot-spot temperature of 180° C, (which is between 50°-75° C above the operating temperatures of conventional insulating materials). Silicone insulation also provides an unusually high overload safety factor. G-E states that they easily withstand temperatures of 200° to 250° C for limited periods, saving expensive rewind costs resulting from burned out insulation.

Transformer Weight Cut—DC silicone insulation together with improved core steels have enabled Kuhlman Electric Co. to reduce the weight of 3 kva distribution transformers from 70 to 45 pounds. Silicone insulation offers electrical engineers unprecedented freedom in the design of similarly dry type distribution or spot welding transformers as well as motors and generators. A new silicone-insulated motor made by Westinghouse, weighs only 60 per cent as much and requires only about half as much space as a comparable motor of conventional design.

In addition to enabling substantial reductions in size and weight, Dow Corning Corp. reports that silicone insulation has many times the life and many times the wet insulation resistance of conventional insulating materials. The bearings of such motors may be permanently lubricated with silicone grease.

Silicone-insulated motors are still in service after 14

months of exposure to water, steam, high ambients and heavy overloads in strip coilers at the Gary, Ind., plant of U. S. Steel Co. Coilers, which are driven by seven motors, take red-hot steel strip from an 80-inch mill and roll it into coils while the strip is cooled with water. These motors are exposed to water, steam, high ambient temperatures and overloads. After several failures, Dow Corning reports, the bottom-most motors, which carry more than their share of the 12,000-pound load, were rewound with silicone insulation. Average life of class B motors in those spots was two months. The silicone-insulated motors were reported to be still in service after 14 months.

Engineers at Cogsdill Twist Drill Co., Detroit, developed a unique machine for grinding drills. Instead of reversing the carriage by a conventional cam or crank, they use a 1 hp, 1200 rpm motor to reverse the carriage drive 50-60 times per second. In this service, class A insulated motors lasted three to four days; class B insulated motors lasted three to five weeks. After repeated failures the reversing motors were rewound with silicone insulation by the A. H. Nimmo Electric Co., Detroit. The motor bearings were packed with DC44 silicone grease and the frame was painted with DC silicone enamel. It is reported that the motors have now been in service over ten months and show no sign of failure.

Silicones in High Temperature Paints—Silicone resins have been developed for use as vehicles in formulating protective coatings highly resistant to heat, excessive moisture, oxidation and ultraviolet rays[11]. Some of the finishes formulated from these resins successfully resist temperatures of 1000° F and higher it is reported; however, these finishes are generally considered too expensive for most industrial applications.

Modified silicone coatings have been used with excellent results at temperatures from 500° to 1000° F on industrial equipment such as ovens, smokestacks and exhaust mufflers and also on such consumer items as space heaters and motorcycle cylinders.

One of the most promising developments in the field of silicone protective coatings is a silicone-fatty acid-glycerol product recently announced by Dow Corning. This material may be combined with alkyd resins to produce finishes possessing the most desirable properties of both the silicone and alkyd resins. Dow Corning reports[11] that white enamels formulated with this new product have better heat resistance and gloss retention than do alkyd-melamine white tests on silicone modified finishes which indicate desirable properties for these materials.

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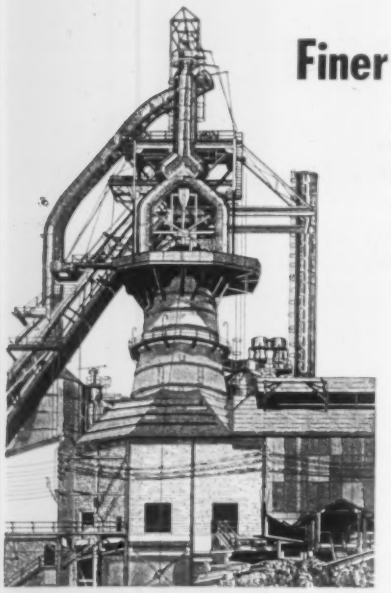


Finer Screening Ups Furnace Output 30 Per Cent

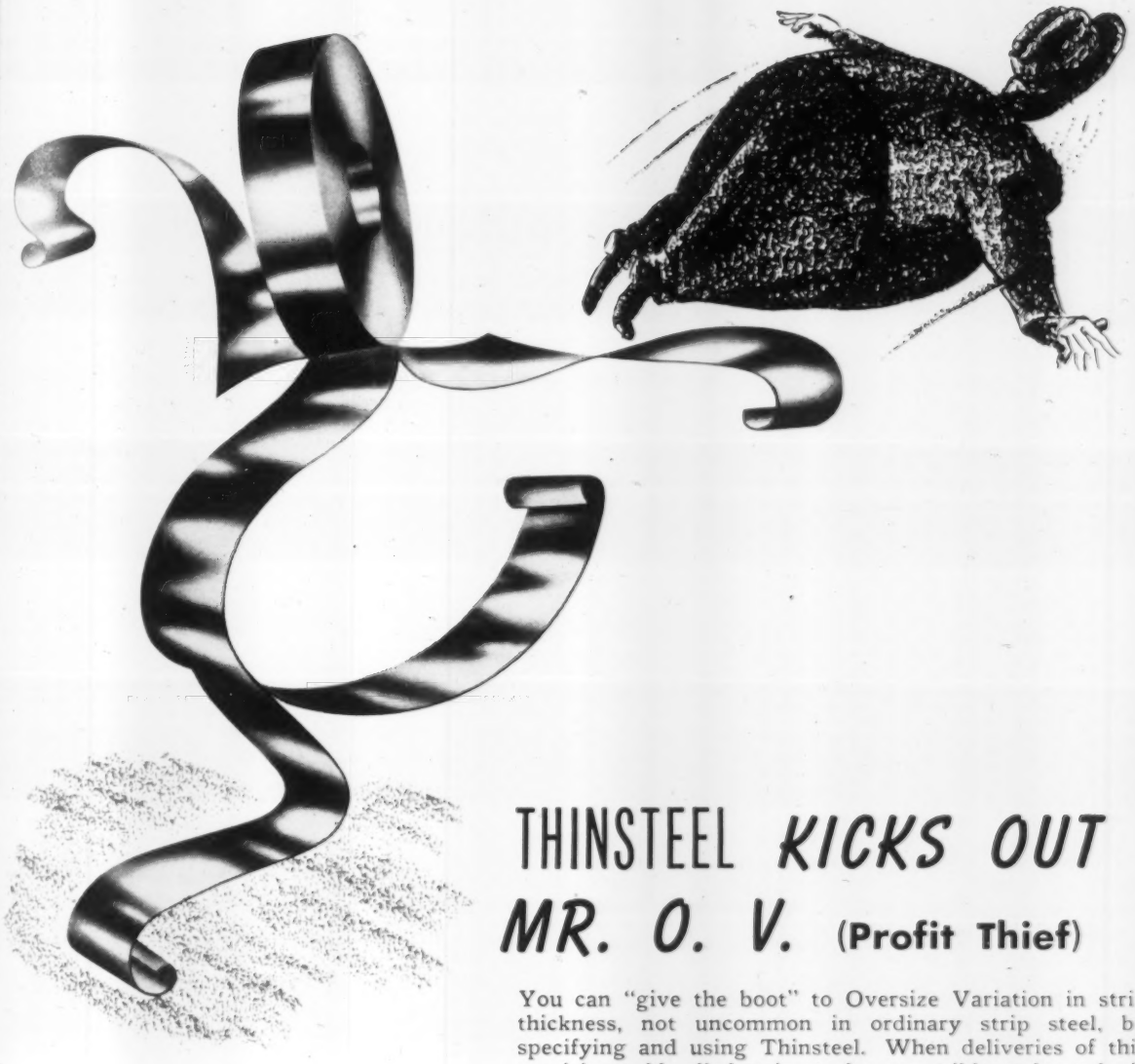
Charging iron-bearing materials screened to ⅜-inch and running the fines through the sintering plant results in drastic change in eastern blast furnace practice. Furnacemen at annual winter meeting relate taphole makeup with hearth breakouts and exchange ideas on current practice

By JOHN D. KNOX
Steel Plant Editor, STEEL

INTEGRATED steel producers in this country are witnessing the final stages of the great Mesabi and Old Range iron ores and are about to become acquainted with application of taconites in blast furnace practice. Iron ore from eastern deposits requires grinding and agglomerating and many foreign ores crushing. Since ore preparation and sintering go hand in hand, means must be provided under today's blast furnace practice of agglomerating the fines.

This was the theme that highlighted the blast furnace session of the annual winter meeting of the Eastern States Blast Furnace and Coke Oven Association, William Penn Hotel, Pittsburgh, February 16. And because of the far-reaching effect of screening blast furnace raw materials to ⅜-inch, as explained by A. H. Fosdick, blast furnace superintendent, Bethlehem Steel Co., Bethlehem, Pa., his paper on "Ore Preparation and Sintering," was acclaimed one of the most important treatises presented before the association in many years.

Stresses Charging of Solids—Mr. Fosdick pointed out that for the past 20 years blast furnace operators have been separating coke by sizes and charging furnace and nut grades separately, resulting in many cases in a daily increase of iron output of 200 tons, a decrease in flue dust production of 80 pounds per ton of iron and an increase (*Please turn to Page 99*)



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COLD ROLLING STRIP

An appraisal of today's theory and practice

Study discloses that the error in calculation of force on the rolls resulting from assumed circular-arc contour is negligibly small

By J. D. KELLER
Consulting Engineer and Partner
Associated Engineers
Pittsburgh

PART II

CALCULATION of the actual deformed contour of the roll, under the action of a pressure distribution corresponding to the peaked curve of Fig. 1 or 3, seems for years to have been regarded as extremely difficult if not impossible. By making use of the mathematical work of M. A. Sadowski[15], however, it can readily be effected (see Appendix B). Sadowski gave the deformation of the originally plane surface of a semi-infinite solid by a uniform pressure acting over a finite width of its surface. It is known that this can be applied to a curved surface also, provided the length over which the pressure is applied is small compared to the radius of curvature; since the only deformations that count are those occurring in the immediate neighborhood of the region of pressure application. Hertz used this principle in his original derivation. For adjacent loads, the principle of superposition also applies.

Peaked Curve Is Examined—What the author did, as a numerical example, was to take Orowan's peaked curve corresponding to the data from one of Lueg's tests (Orowan, p. 158-159) in which the maximum pressure at the peak of the curve was slightly more than four and one-half times the average of the pressures at the beginning and end of contact, and apply this pressure distribution to pass No. 5 of the author's paper in STEEL (1942), where the diameter of the steel work-roll was 16 inches and the deformed contact length was 0.372-inch. The scale of ordinates was so adjusted as to give, with this pressure distribution curve (Fig. 3), an *average* pressure of 150,000 psi, as previously calculated in that paper. The contact length was divided into ten equal parts, the average pressure for each space (dot-dash lines in Fig. 3) was considered to be the Sadowski uniform loading for that space, and the deformation thereby produced at the center of that space and at the center of each of the other nine spaces was calculated. Summation of the effects gave the total deformation at each space.

The deformation thus calculated with reference to a plane surface is shown by the solid-line curve in Fig. 7, wherein is also shown, for comparison, the deformation produced by Hertz' elliptical pressure distribution (broken line in Fig. 7) for the same average pressure. The peaked curve produces somewhat greater maximum deformation than does the elliptical, and also, as would be expected, moves the point of maximum depression farther from the entry end and nearer to the delivery end of the contact length.

When applied to the actual roll surface, the deformed contours become those shown in Fig. 8, in which the vertical distances are, for the sake of clearness, much more highly magnified than the horizontal distances. It will be noticed that while there is a place, about 60 per cent of the length from the entry end, at which the roll surface is made practically flat by the peaked pressure curve, in this example at least it is not really indented, and the tangent to the surface is far from becoming horizontal at any place except just at the delivery end (Fig. 9). In this representative example at least, the deviation produced by the peaked form of the pressure curve is far from being as pronounced as expected by Orowan.

While the author is never inclined to favor theoretical results in contradiction to actual experimental measurements provided the latter have been confirmed, in the present case the experimental results shown in Fig. 4 can hardly be accepted unless sub-

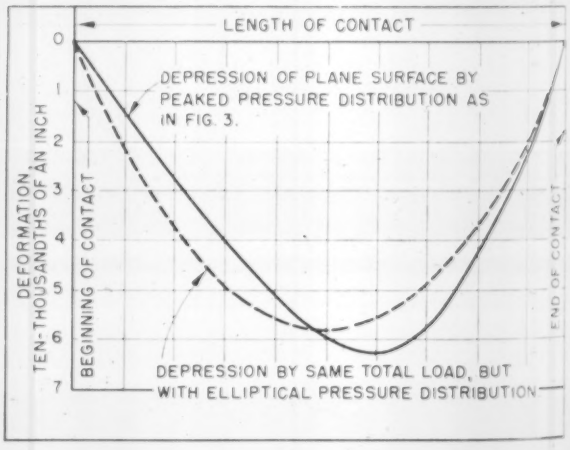
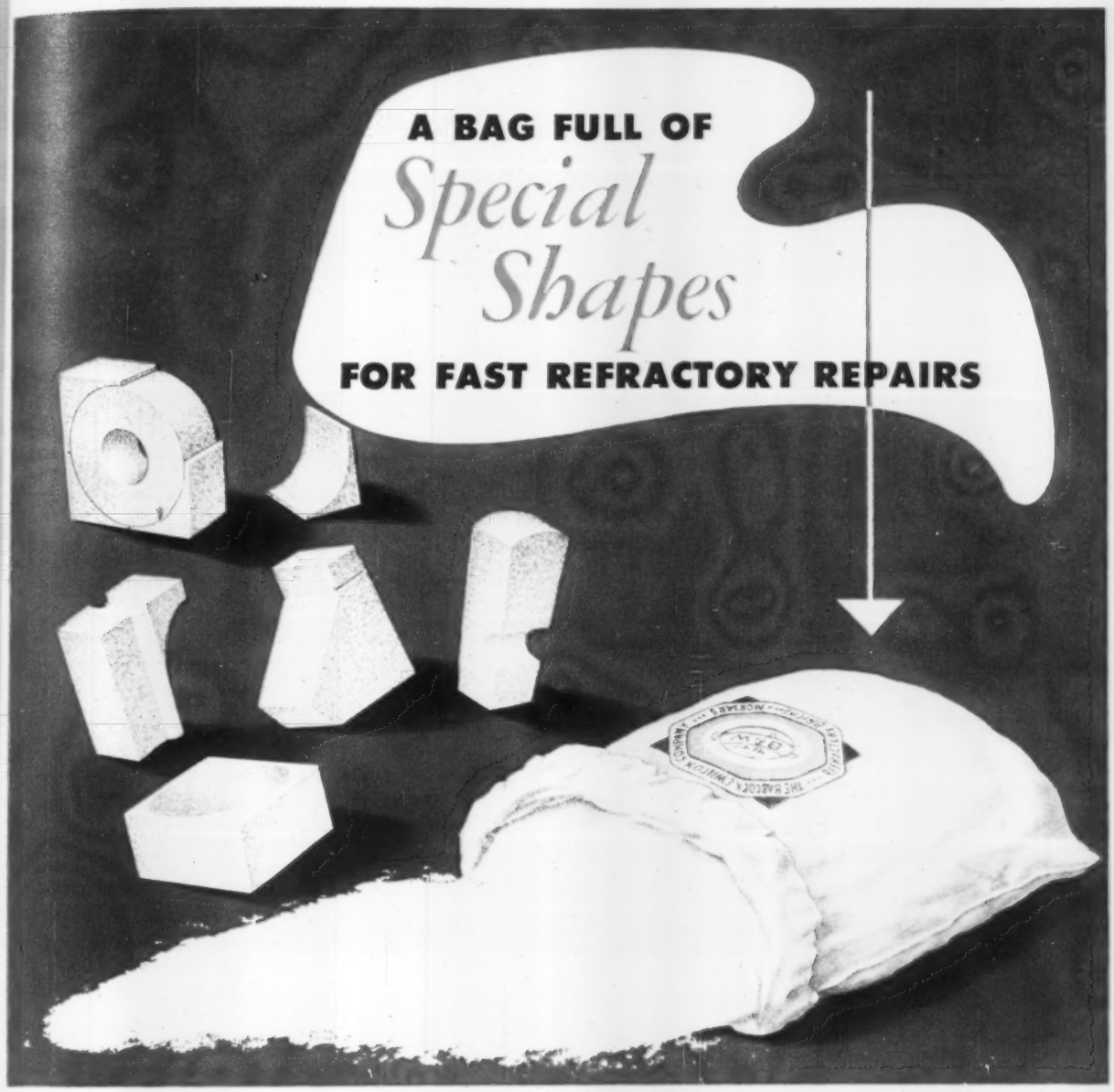


Fig. 7—Deformation of a plane surface by pressure distributed as in Fig. 3



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stantiated by additional work, using other methods. Criticism on this point does not imply any lack of appreciation of the value of Orowan's work as a whole.

Effect of Distortion of Roll Contour on Form of Pressure Curve—Since the rate of increase of pressure caused by the friction of the strip on the rolls, at any point of the contact length, is proportional to the sum or difference of the friction coefficient and the slope of the deformed roll surface at that point, it is evident that the pressure distribution curve corresponding to the solid-line roll contour in Fig. 8 will be different from the curve calculated on the basis of the assumed circular-arc contour (Fig. 3.) Orowan seems to have expected that the resulting difference in the pressure curve would be large. To determine some actual values, the author made the calculation for the deformed contour shown by the solid line in Fig. 8, using a simplification of the v. Karman equation (see Appendix C), and the finite-difference method. The slope of the roll surface at each point was determined graphically from Fig. 8, and its variation is shown in Fig. 9.

The pressure curve thus obtained is shown by the solid-line curve in Fig. 10, corresponding to the deformed contour of Fig. 8, and for comparison the pressure curve corresponding to the circular-arc contour (which might be called the v.Karman curve) is shown by the broken line. The resulting numerical values of pressure are shown in Fig. 2. It is evident that, at least in this example which is representative for the cold rolling of strip, the difference between the two curves is negligible—hardly more than the thickness of the line of the curves in the illustration.

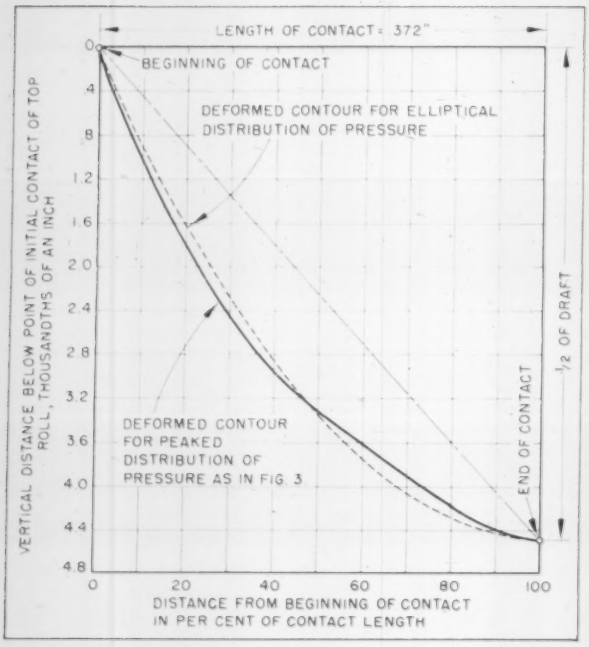

Fig. 8—Deformed contour of upper work roll produced by pressure distribution as in Fig. 3. For steel work rolls 16 inches diameter, 0.372-inch deformed contact length, 0.009-inch draft (Pass No. 5, Keller paper, STEEL, 1942)

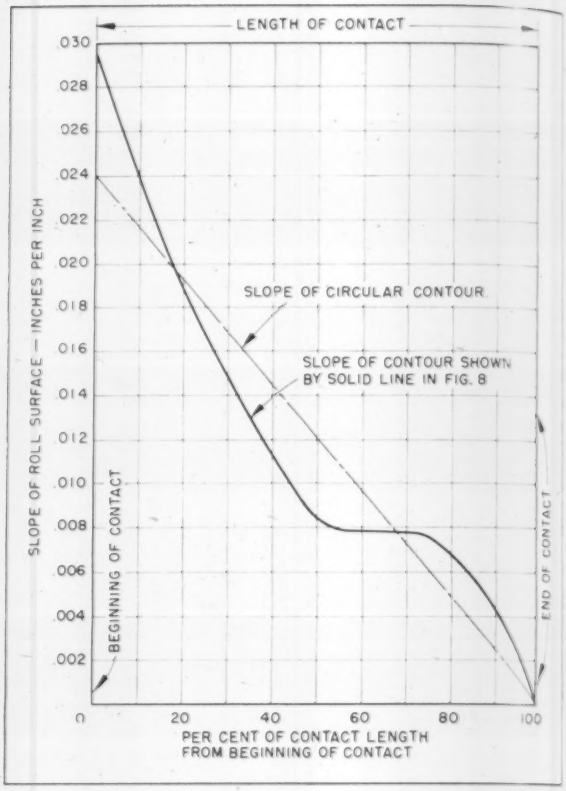

Fig. 9—Slope of roll surface in region of contact of strip. For roll contour shown by solid curve, Fig. 8

Furthermore, the peak pressure ratio is even lower than in the assumed curve (Fig. 3) for which the deformed contour was calculated; namely 3.41 times the average of the pressures at the ends of contact, as compared with about 4½ times in Fig. 3. The deviation from the v.Karman curve would therefore be even less than indicated.

From these studies the author concluded that, in cold reducing mills using large-diameter work rolls with good lubrication, the error in calculation of the force on the rolls resulting from the assumption that the deformed roll surface has a circular-arc contour is negligibly small.

Elastic Regions at Ends of Contact Length—In the 1937 paper[16] entitled "How Thin Can Strip Be Rolled?", the author mentioned, and indicated in a sketch, the existence of a region of elastic contact between strip and rolls at each end of the contact length, beyond the region where the strip is in the plastic-flow state; but gave no numerical values for the same.

In the discussions of the recent paper by H. Ford[1], it was stated that the British investigators, by measurements on the experimental rolling mill in the Cavendish Laboratory at Cambridge, had demonstrated the existence of elastic-contact regions and determined the magnitude of the pressures therein. They found these regions particularly important on the exit side of the contact length and for small percentage reductions. No numerical data, however, have

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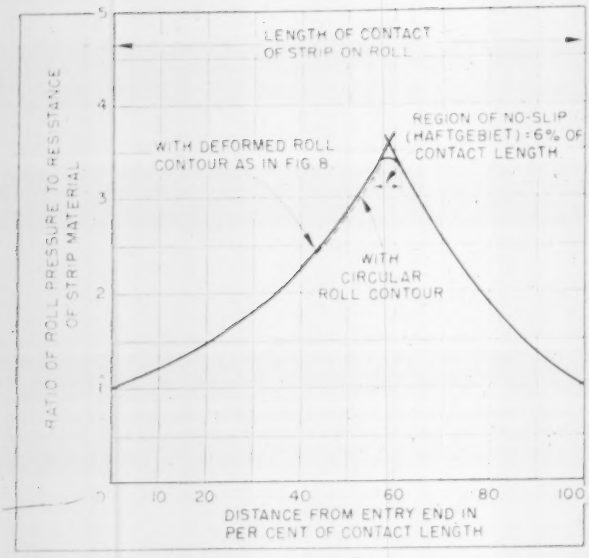

Fig. 10—"Friction hill" calculated for deformed roll contour shown in Fig. 8 with conditions as stated for Fig. 2

yet been published concerning this, so far as known to the author.

APPENDIX B—Deformation of an Elastic Body by a Uniformly Distributed Pressure Acting on a Small Width of Surface.

In Fig. 11, the surface of the semi-infinite elastic body, before loading, is the plane S. The total load P is distributed over a rectangle of width $2a$ which is long compared to its width, and the deformed contour of the surface becomes E-A-B-C. The depression, or vertical deformation at the surface caused by the load, expressed as the difference between the depression at x and that at the origin O, is given by Sadowski as

$$v(x,o) - v(o,o) = \frac{p \cdot a \cdot (1-n)}{\pi G} \left(\text{Log}_e \left| 1 - \frac{x^2}{a^2} \right| + \frac{x}{a} \cdot \text{Log}_e \left| \frac{a+x}{a-x} \right| \right) \quad (7)$$

for all values of x except $x = \pm a$, and for the latter

$$v(\pm a, o) - v(o,o) = 2 \text{ Log}_e \frac{2p \cdot a \cdot (1-n)}{\pi G} \quad (8)$$

The symbol n represents Poisson's ratio, approximately 0.30 for steel, and G = modulus of elasticity in shear, approximately 12,000,000 psi for steel.

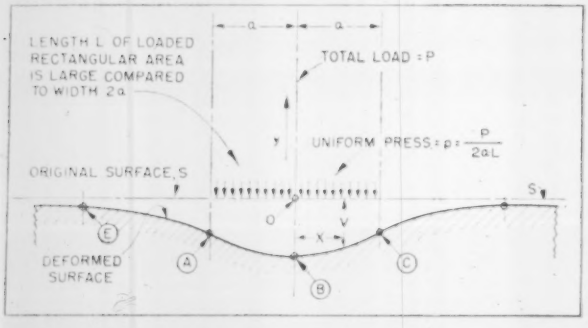

Fig. 11—Depression of a plane surface by uniform pressure acting on a long narrow rectangle (Sadowski)

The vertical lines in Eq. (7) mean that the numerical values of the expressions contained between these lines are to be the absolute rather than the algebraic values and hence, never negative. Referring to Fig. 11, v and v are positive upward.

For points outside the region of width $2a$ in which the pressure is applied, x becomes greater than a; thus for point (E), x is the horizontal distance from (E) to O.

APPENDIX C—Simplification of the v.Karman Equation for Use in Calculating the Friction Hill.

The differential equation of v.Karman[7] is:

$$\frac{d}{dx}\left(z \cdot h\right) = p\,(\sin\phi - f \cdot \cos\phi) \quad (9)$$

where z = horizontal pressure or stress, p = vertical pressure or stress (for horizontal direction of rolling), f = coefficient of friction, ϕ = angle of tangent to roll surface from the horizontal, and h = thickness of strip, all at a distance x from the exit end of the contact length, taken positive in the direction opposite to the motion of the strip.

Since angle ϕ is always small in strip rolling, $\cos\phi \simeq$ unity and $\sin\phi \simeq \tan\phi = dy/dx$; also, from the "condition of plasticity", $(p - z) = S$, the natural flow resistance of the strip material. Making these substitutions in Eq. (9), differentiating and making suitable transformations, we obtain the equation:

$$h \cdot \frac{d\left(\frac{p}{S} - 1\right)}{dx} + \left(\frac{p}{S} - 1\right) \cdot \frac{dh}{dx} = \frac{2p}{S} \cdot \left[f \pm \frac{dy}{dx} \right] \quad (10)$$

which can be simplified by the consideration that:

$\frac{dh}{dx}$ also $= \frac{dy}{dx}$ = slope of deformed roll surface at x.

In using Eq. (10) as a finite-difference equation, after dividing the contact length into a number of equal spaces of length x, for each space the average strip thickness in that space is found from Fig. 8 and the average slope of the deformed roll surface from Fig. 9. Starting at each end of the contact length, where the value of p is known from the strength S and the tension conditions, the average values of h and dy/dx for Space No. 1 are considered constant over that space, and the pressure at the end of the space is obtained from Eq. (6). This pressure becomes the initial pressure for Space No. 2; average values of h and of dy/dx for the latter are read from Figs. 8 and 9, and Eq. (6) is again used to obtain the pressure at end of Space No. 2, or beginning of Space No. 3; and so forth. When proceeding forward from the beginning of contact, if x is taken positive in the same direction as the strip motion, the minus sign applies to dy/dx in Eq. (10); when proceeding backward from the end of contact, with x taken positive in the direction opposite to that of the strip motion, the plus sign applies to dy/dx in Eq. (10).

REFERENCES

15. M. A. Sadowski, *Trans.* ASME, v. 54, 1932, pp. 221-224 (APM 54-21).
16. J. D. Keller, *Blast Furnace and Steel Plant*, Oct. 1937, pp. 1110-1113.

(To be continued)

Flange Coupling Selector Revised

Revised edition of a flange and coupling selector, designed by Nooter Corp., St. Louis, is available upon request. The flange size selector lists such relevant facts as the outside diameter of flange, thickness, outside diameter of raised face, number of holes, diameter of holes, diameter of bolts, bolt circle—for series 15 and 30 flanges.

The coupling selector shows average sizes of standard, extra heavy, 3000 and 6000-pound couplings.

Finer Sintering

(Continued from Page 90)

in the fuel ratio from 1 to 6 points. He emphasized that blast furnaces should screen ore the same as they have been doing with coke to effect the ultimate in blast furnace practice, and he presented figures to show that it is possible to increase the average daily furnace make by almost 30 per cent merely by screening iron-bearing materials to ⅜-inch. He also warned that the blast furnace industry is faced with an abundance of fine ores and that these will require screening and agglomerating practice on a larger scale than at present.

Various sizes of screened ores were cited by the speaker to show the iron content, as follows:

Per Cent Iron After Screening

Grade ore	1" Lump	⅜"	−⅜"
Foreign	30.7	18.2	51.5
Bessemer		4.1	58.9

In some grades of American ores 60 per cent passes through a ⅜-inch screen whereas in certain foreign ores the range is from 50 to 70 per cent, so that unless furnace operators have a screening program they are charging more fines than is generally realized.

Discussion of Mr. Fosdick's paper stressed the importance of screening in connection with sinter, for when the size is segregated, there is a segregation in analysis with an appreciable decrease in the silica content. The trend in the production of plus 1-inch lump sinter is upward. Consensus is that screening results in a definite improvement in the properties of sinter.

Sintering Grows in Importance—Management for many years has looked at sintering plants merely as an overcast machine in charge of nontechnical operators; today the sintering operation is commanding respect at the front office where daily reports undergo careful scrutiny of the tonnage leaving the pallets at the discharge end of the machines. Problems involved in making better sinter involve such factors as sizing of raw materials, control of return fines, better layer charges and the sizing of the clinkered product leaving the machine. Major problems facing the sinter industry include the effect of sinter on blast furnace operation, its quality and how to control the desired quality.

An authority on sintering plant construction and operation asserted that the research work at Bethlehem's plant on the use of sinter in the blast furnace, as described in Fosdick's paper, is the first work ever to be done along this line. The

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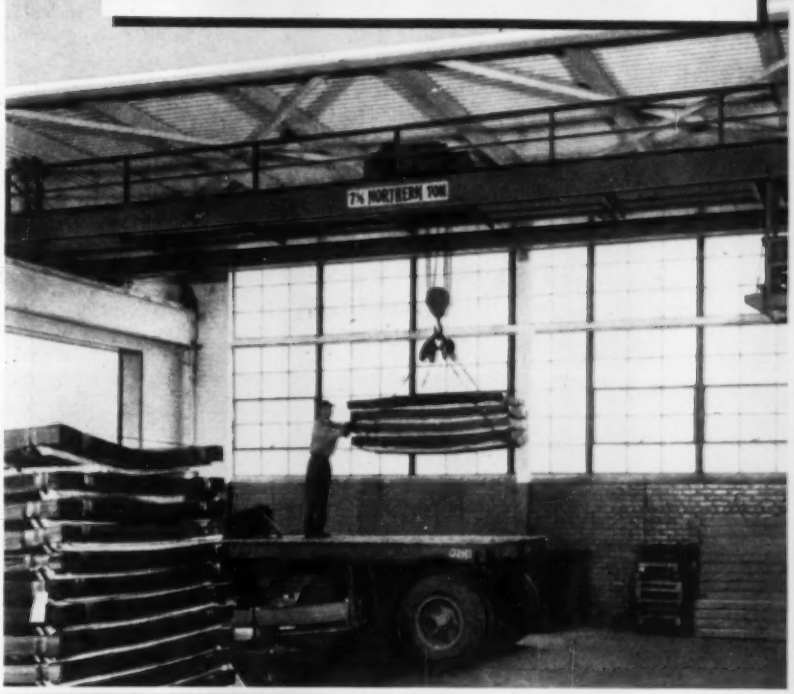

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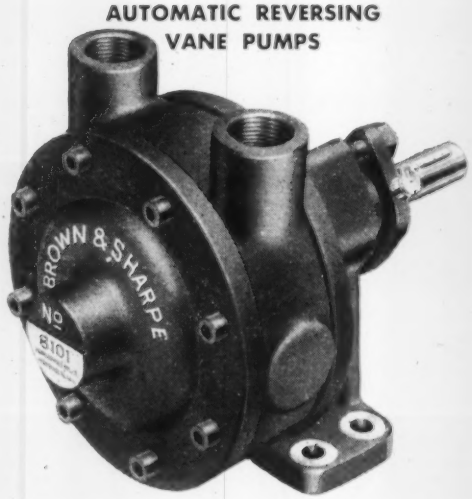

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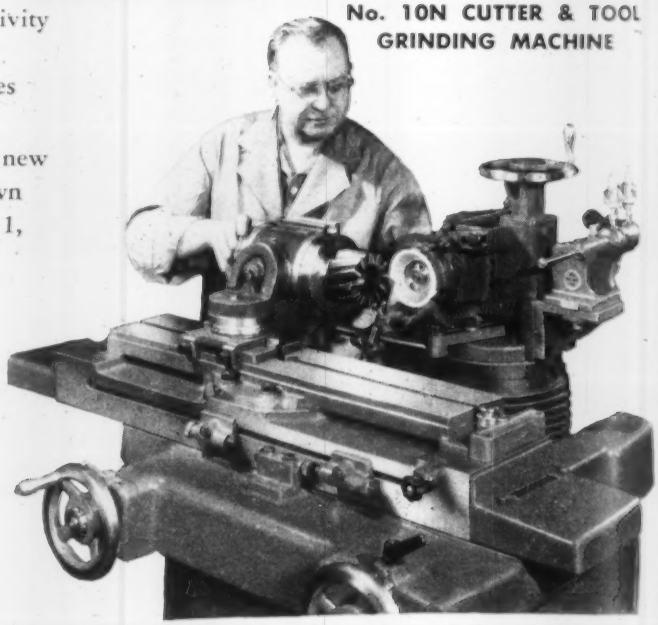

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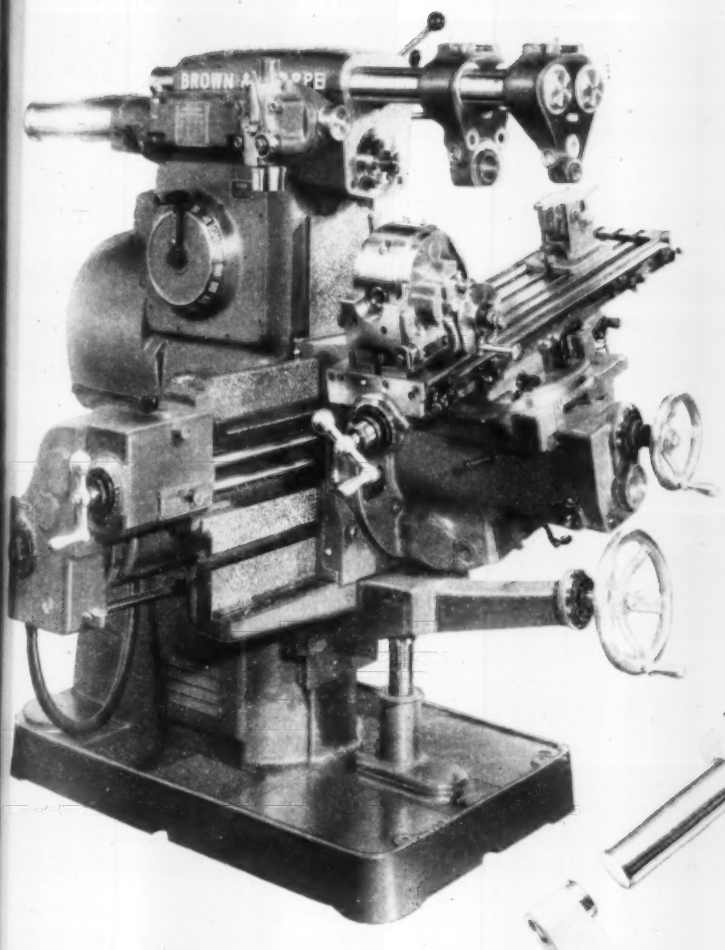

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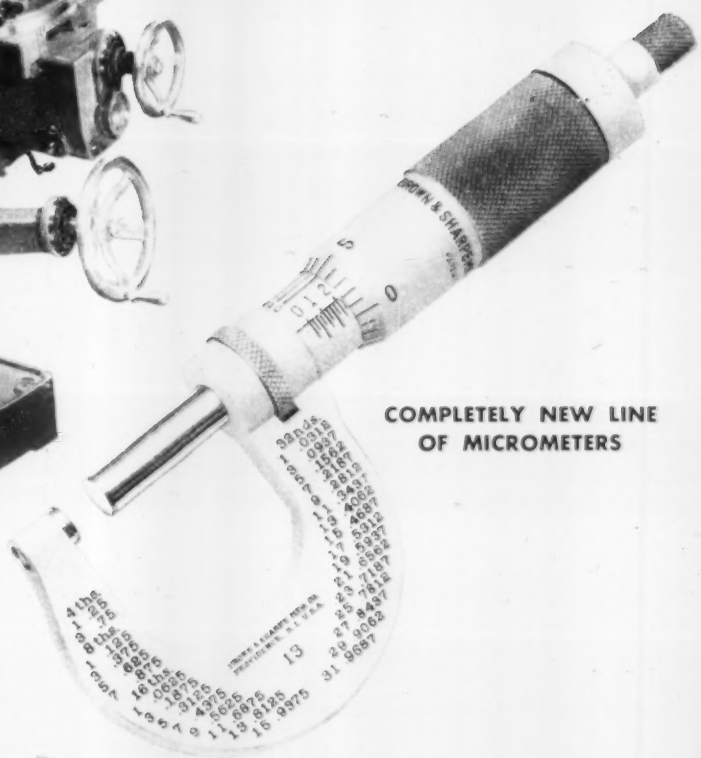

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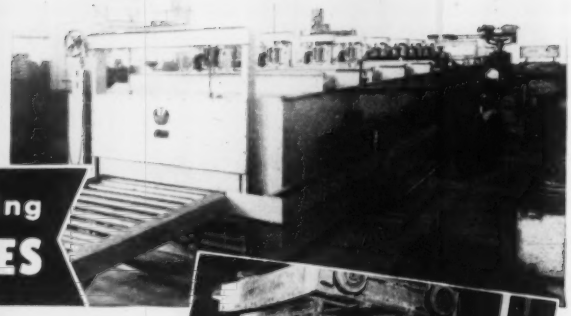

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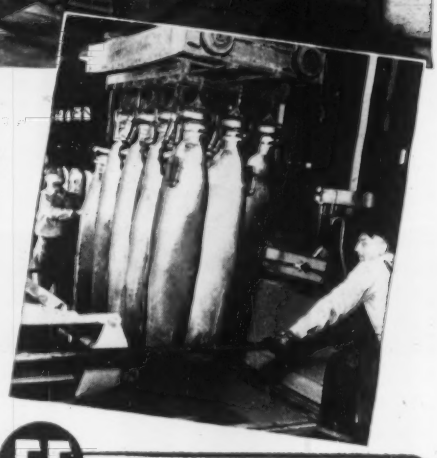

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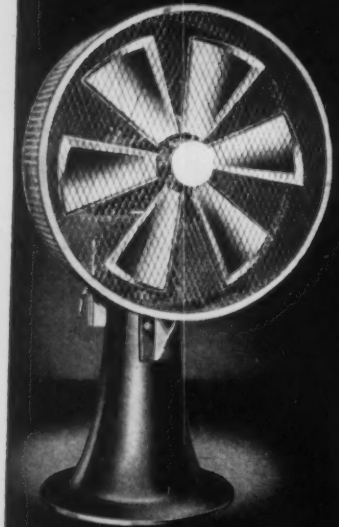

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largest percentage of sinter producers in this country pass their make over a ¾-inch screen, but Bethlehem is the only company screening to ½-inch. Blast furnacemen are in agreement with the fact as related by one operator that flue dust coming from a stack is a sign of a sick furnace since it indicates channeling and this leads to blowing large quantities of dust out of the top of the stack into the dust catchers. Charging uniform sizes of sinter and ore over the bells reduces abnormalities in the travel of the furnace and results in better furnace practice.

Breakouts Occur Without Warning—Description of blast furnace breakouts as related by a number of operators at the symposium on hearth failure failed to uncover any plausible method for recognizing a warning beforehand. Certain recommendations, however, were suggested including the installation of segmental hearth staves to localize the damage to the hearth cooling system and the operation of cooling water valves by remote control.

While 90 per cent of the recent breakouts have been in the area of the taphole yet some have occurred at other locations around the hearth jacket. At one plant during the recent coal strike breakouts occurred at four of its stacks, one of them taking the water lines in the immediate vicinity. A recording thermometer installed on a western stack, which broke out a few months ago, failed to give any indication of trouble beforehand. Suggestions of various operators for maintaining suitable tapholes were these:

An efficient mud gun and taphole maintenance are "musts" against blast furnace breakouts.

Tapholes must be built right in the beginning and then maintained right. Drilling a 4-foot hole one cast and a 6-foot hole another is bound to result in adverse practice. Use of a rigid drill slanting at the right degree and stopping the hole at the end of a cast with a suitable mud gun are important factors.

Long taphole is ideal and its face should be kept back of the cooling segment. Use of a drill rack on every cast in recommended. A templet 8 inches long and of the same diameter as the nose of the mud gun when placed in the hole provides a face 8 inches inside the hearth cooling segment. A long blow at the end of a cast is discouraged, for the last 5 or 10 tons of metal in the furnace will find its way out of the hearth on the following cast.

When the mud gun is swung into place for latching at least five times in 24 hours, it imparts a hard jolt to the hearth walls. This may have something to do toward weakening the hearth in the vicinity of the taphole, thus leading to a breakout later.

Because of this danger it is well for the blower to inch the mud gun into the hole during the last few feet of travel.

Slag Widely Used — Something is done with 55 per cent of all blast furnace slag produced by American furnaces, according to H. T. Williams, materials engineer, Standard Slag Co., Youngstown, O. In speaking on the "Development and Use of Blast Furnace Slag," he mentioned that 30 million net tons of blast furnace slag was produced in 1949, 72 per cent of which found its way into commercial use. At present 34 per cent of production is used for the base of highway pavements; railroad ballast constitutes about 20 per cent. More than 50 per cent of the mineral wool being marketed today and weighing 10 pounds per cu ft is made of blast furnace slag.

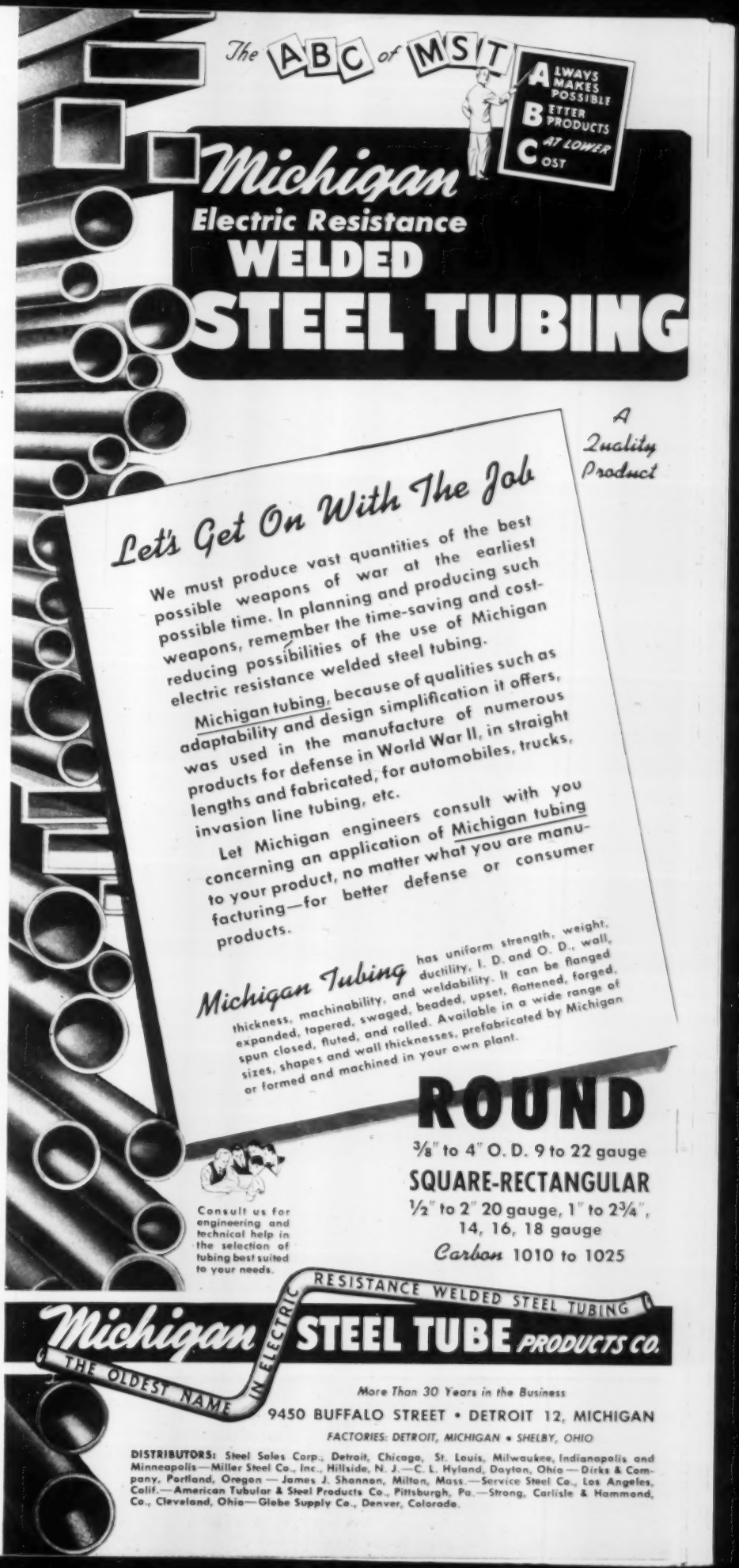
Marketing slag from blast furnaces involved three problems:

1. The industry is seasonal; shipments are only made six months of the year.
2. In the winter months various sizes must be anticipated for the following season and hence large stockpiles must be maintained.
3. Overproduction occurs because of concentration of blast furnaces in the Pittsburgh and Chicago districts. In Pittsburgh area it is estimated that 7 million net tons of blast furnace slag is made annually which is double of all the aggregate used between the Chicago and Pittsburgh shipping area.

That consideration is given to the disposition of blast furnace slag was brought out by various furnacemen in discussing the Williams paper. An effort is made to maintain uniformity in granulated slag and to maintain the magnesium content around 3 and the aluminum content around 13 per cent. Variation in the the type of slag leads to a variation in the iron content; but under normal operation the slag contains 1 per cent iron. A study of the life of highways having blast furnace slag as one of the components discloses that slaking is never encountered when the silica-alumina ratio is about 0.98 to 1.

Paste Protects Surfaces

American Sand-Banum Co. Inc., New York, is marketing a protective material called Tinallium in the form of a nondrying black paste, adaptable for all metals, woods and concrete mixes for preservation against weathering conditions, acids, fumes and chemicals. It is claimed to provide protection against alkali, rust, corrosion, oxidation, heat, cold, steam, gas or sulphur fumes, brine and other destructive agencies either above or below ground. The compound will not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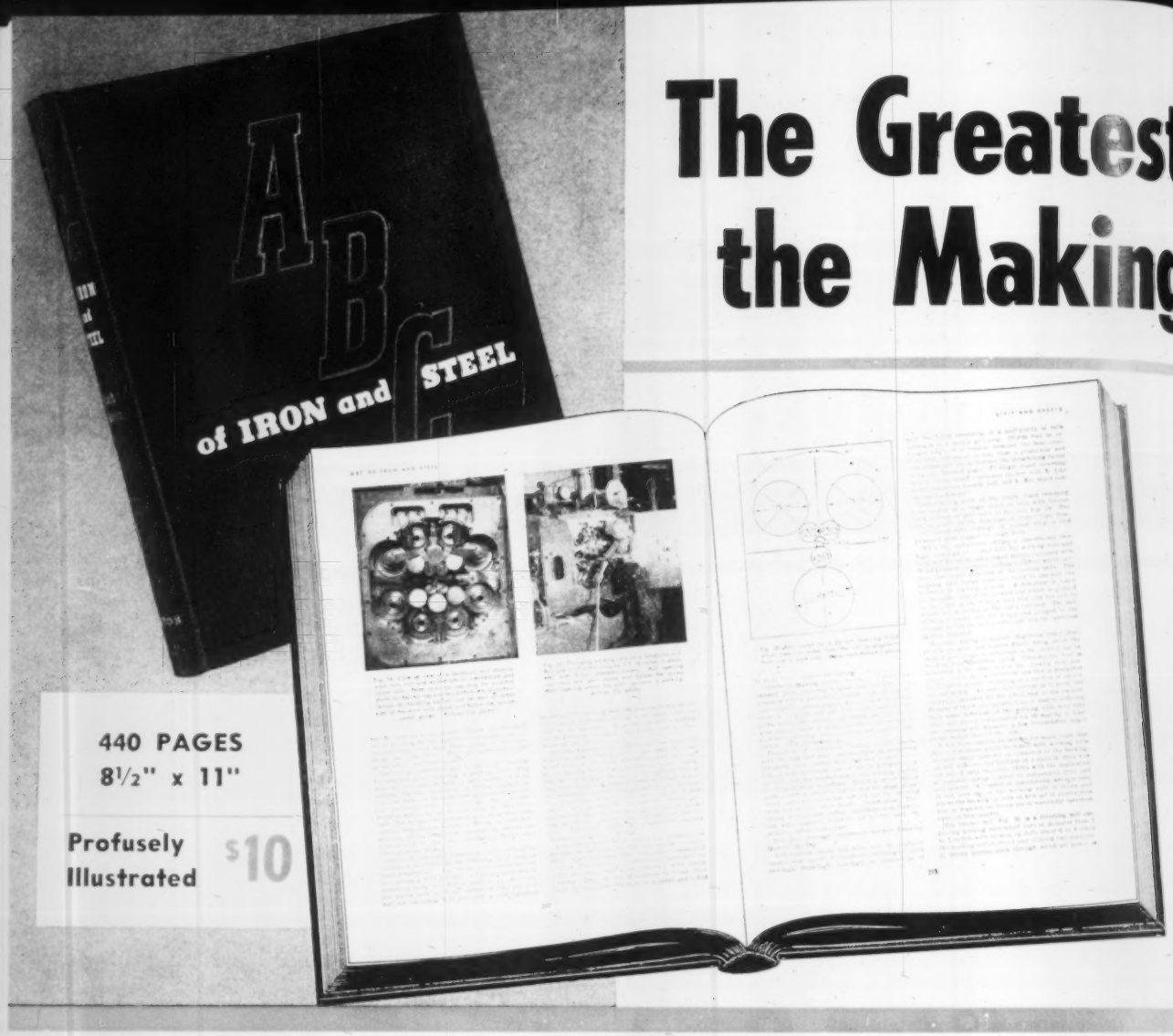

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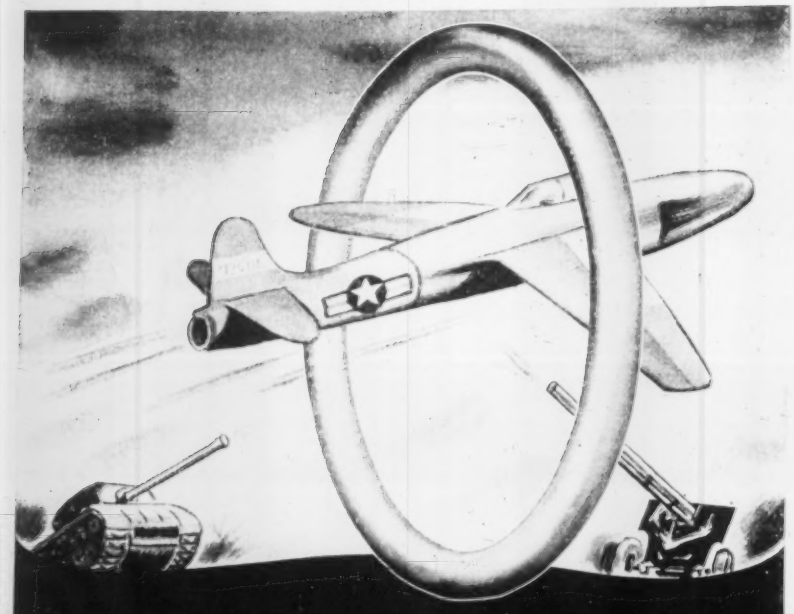

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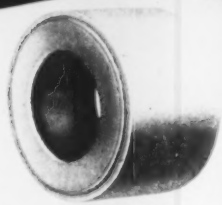

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Room for Much Improvement In Military Inspection

There is room for much improvement in military inspection, according to a survey of 300 companies which has just been completed by the National Industrial Conference Board.

Reviewing World War II experiences, industry for the most part commends the services for having done a big job and for having done it well, considering the sudden and gigantic increase in workload, and severe shortage of trained or qualified inspectors. Military inspection, the study notes, of war production serves two overall purposes: It guarantees that military equipment is true to specifications and of high quality; and it guarantees to the public that its tax money is purchasing what has been ordered and in the correct quantities.

The study also points out that if inspection is carried to extremes, it can defeat its own purposes by denying the soldier in the field any equipment—good, bad or indifferent, or by slowing down production to such a point that equipment reaching the soldier is "too little and too late."

Criticisms by Contractors — Executives and quality-control directors of World War II contractors make these major criticisms of armed services inspection in World War II:

Too much duplication among the services.

Too much duplication of the contractors' efforts.

Military inspectors, especially civil service personnel, were poorly trained and unqualified for their jobs.

Many of the design specifications were too rigid or too ambiguous.

Many of the design requirements were impractical, too complicated and did not follow standard commercial practices.

Too much 100 per cent inspection; too little spot checking and use of statistical quality-control methods.

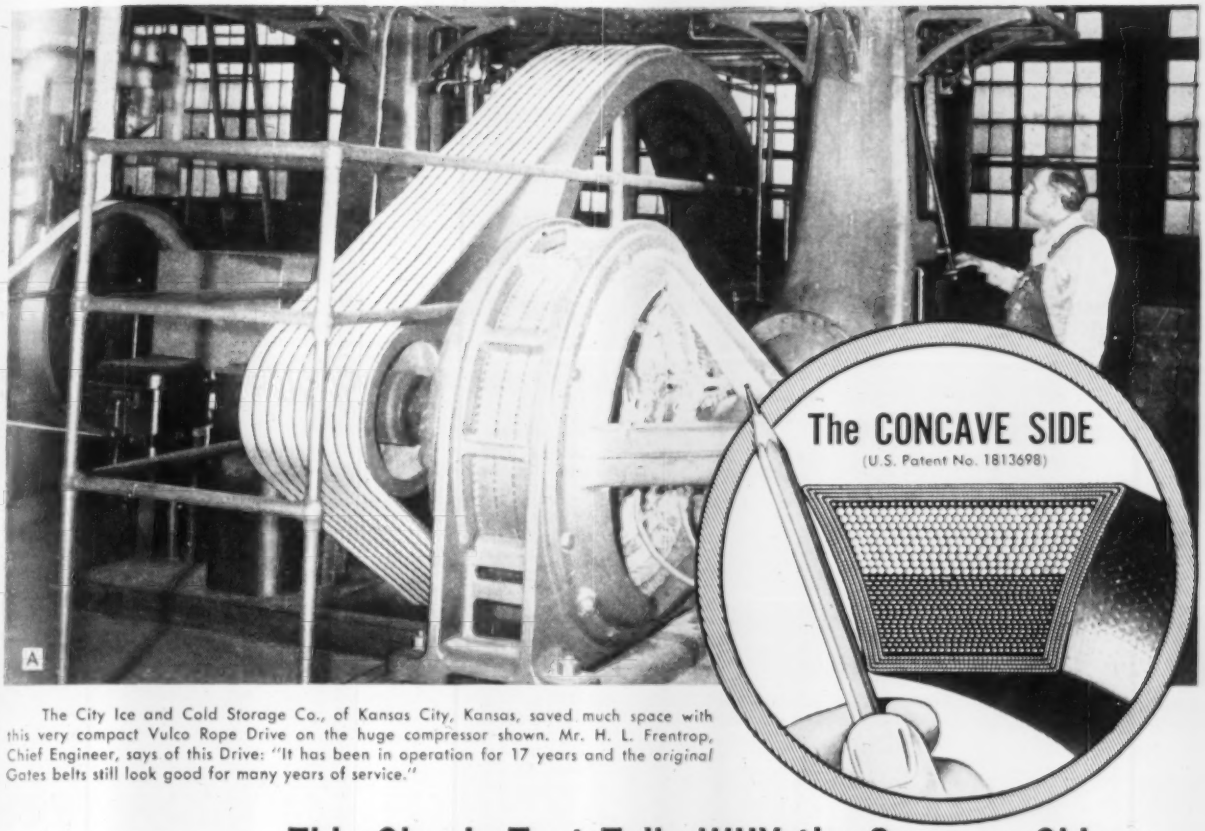
Not enough co-operation and awareness that the contractor could do the job, if given the chance.

Too much *red tape*.

Criticisms by Services — Armed services inspection personnel make these criticisms of industry:

Lack of knowledge of the contract and its requirements.

Deliberate efforts on the part of some contractors to evade the con-



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Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

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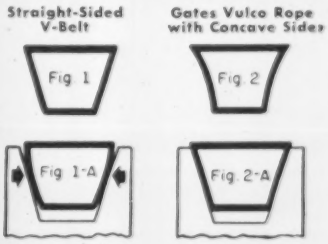

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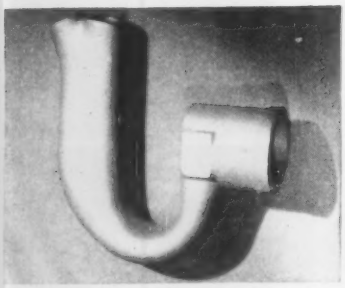

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tract requirements or make good a low bid by cutting corners.

Lack of any inspection system that could be called one—especially true of small and medium-sized concerns.

An attitude, on the part of some, of "soak the government wherever possible."

Limited use of manufacturers, particularly small and medium-sized companies of modern management techniques and statistical quality control.

An unsympathetic attitude toward use or introduction of quality-control techniques.

Lack or inadequacy of quality history records by many companies.

The services report several improvements since World War II in military inspection procedures and methods. Unification has helped achieve some of these improvements through co-ordinated and single-service procurement. Another aid has been the overall co-ordination program of the Munitions Board inspection agency. It is designed to achieve greater uniformity in inspection methods and help eliminate much of the inspection duplication existing among the three services.

The three military departments report these specific accomplishments:

Elimination of a great deal of the duplication among the three services through co-ordinated inspection and exchange agreements.

Establishment of a central policy and co-ordination control organization within each of the services in inspection matters.

Greater standardization of procedures for all three departments.

Revision and simplification of design specifications and inspection directives.

Concerted drives to reduce paperwork and number of required forms.

Among recommendations made by industry and by the armed services for solving inspection difficulties before they occur are the following:

Industry recommends that the military: Obtain better-qualified personnel for inspection; unify inspection activities for all three services in one central agency; employ source inspection on subcontracts.

The military recommends that the contractor: Know the contract thoroughly, its supporting documents, and all requirements in detail; develop a better inspection system (this particularly directed toward the small and medium-sized manufacturer); develop written inspection procedures and manuals; recognize that paperwork and red tape are sometimes necessary to assure that supplies are

what they should be and are available when needed.

The study, like previous ones on industry-military relationships, was undertaken at the request of the board's advisory council on industrial mobilization, headed by A. W. Robertson, chairman of the board of Westinghouse Electric Corp.

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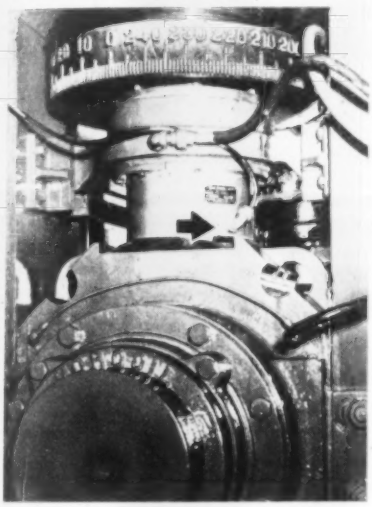
To obtain more uniform aluminum sheet products, cold strip rolling mills at the Edgewater plant of Aluminum Co. of America have been equipped with load-measuring units incorporating bonded resistance wire strain gages.

With these load weighing "cells" at each end of the mill rolls, closer control is possible because they pro-



vide an accurate, continual indication of roll loads, and the load may be adjusted while rolling. This feature permits control of sheet gage as the sheet is being produced, without waiting until a whole length has gone through the rolls. Protection against bearing overloads also is provided.

The mill reduces aluminum strip from 11-gage to 24-gage. Load capacity of the two cells on the mill is 600,000 pounds each. An important feature of the force-measuring device in rolling mill service is that it has practically no deformation under wide variations of load.

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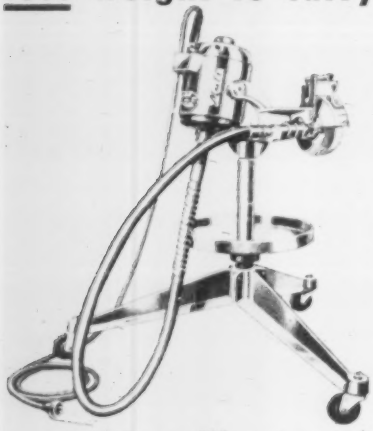

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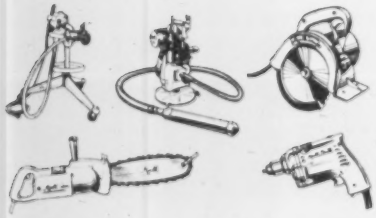

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Humidity Control Data Supplied

Technical and operating information on Kathabar humidity control equipment is contained in a bulletin to be published periodically by Surface Combustion Corp., Toledo, O. Title of the bulletin is "The Humidity Engineer" and it is being distributed to persons concerned with the humidity control field and its attendent problems.

Up-to-date information will be provided concerning Kathabar engineering developments as applied to all phases of the air conditioning field. Comfort conditioning and industrial processing applications are two additional features to be covered. Air conditioning engineers, process engineers and plant maintenance men may secure the publication without cost by writing to the company on business stationery.

Insulate Against Corrosion

Corrosion of equipment due to condensation of moisture from hot gases can be avoided by insulating the heated equipment, according to the Magnesia Insulation Manufacturers Association. A typical use of insulation for this purpose is illustrated by a recent installation at the downtown steam plant of a Baltimore public utility.

To prevent air pollution by smoke from the boilers, giant dust collectors on the roof of the plant clean the smoke before it goes out through the stacks. The temperature of the metal collector shells must be kept between 280-300 F, since condensation and resulting corrosion would increase maintenance requirements and reduce the life of the collectors.

This degree of temperature control was obtained by insulating the collectors with a layer of 1½-inch thick 85 per cent magnesia blocks. The insulation was applied over 6 x 6-inch wire mesh welded to the exposed angle stiffeners of the collectors. A layer of 1½-inch hexagonal wire mesh was then applied, and covered

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The precision quality of Gordon Thermocouple Extension Lead Wire is the result of continued experience since 1915 in careful selection and inspection that meets rigid insulation requirements and Bureau of Standards specifications.

Gordon's Chicago and Cleveland plants carry complete stocks of Thermocouple Extension Lead Wire for practically every application. (See illustrations below.) These are good reasons why your order gets immediate delivery of a QUALITY product. ORDER NOW! No delays. Prices available on request.

CHROMEL-ALUMEL, Cat. No. 1231(3-A), 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

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IRON-CONSTANTAN, Cat. No. 1236-C, 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

COPPER-CONSTANTAN, Cat. No. 1235-A, 14 ga., SOLID-DUPLEX, each wire cotton, rubber, weatherproof braid, lead sheath overall.

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with ½-inch thick layer of asbestos cement.

Because the installation is outdoors, the insulation was given a weather resistant finish. A layer of 1-inch hexagonal wire mesh was stretched over the asbestos cement, over which weather-resistant asphaltic asbestos plastic was troweled on.

Metal Powder Standards Set

A method for particle size analysis and fractionation of granular metal powders in the subsieve range (1 to 40 microns) using air or gas classification is contained in a standard released by the Metal Powder Association. Designation of the standard is 12-51T and it provides a theoretical background of the air or gas elutriation method based on Stokes law along with operational details and drawings of typical classification equipment suitable for subsieve particle size analysis.

Another standard describes a testing procedure for determining the as-sintered bending strength (modulus of rupture) where applicable, green density, sintering shrinkage and expansion and the as-sintered hardness of compacted and sintered metal powder specimens. This standard is 15-51T and gives working details of the die and punches for making the test specimen as well as details of the fixture for testing bending strength. Copies of each standard may be obtained for 25 cents a copy from Metal Powder Association. Address: 420 Lexington Ave., New York 17.

Battery Mercury Reclaimed

General Dry Batteries Inc., Cleveland, established a market for used mercury cell hearing aid batteries and announced a plan through which hearing aid dealers can help to hold the price line in the face of skyrocketing mercury prices. "While the reclamation of mercury from hearing aid batteries is an expensive process, every ounce that we can salvage will relieve the shortage that is pushing prices up", says Carl Brooks, general sales manager of the company.

He points out the price of mercury has increased 300 per cent in six months. It now represents more than 65 per cent of the average manufacturing cost per cell. Special cartons for use in shipping the used cells to Cleveland, where the mercury will be reclaimed, are being placed in the hands of some 3800 hearing aid equipment dealers. Payment for the used batteries will be by check direct to shippers and based on a schedule of prices ranging up to 4 cents per battery, depending on the size.

New Coatings Relieve Tin Pinch

Increasing shortages of tin and alloy metals will be considerably alleviated by chemical developments made in coating materials, J. L. McMurphy, manager of the Chemicals Division of General Electric's chemical department recently predicted.

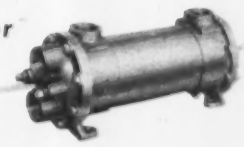
With losses from corrosion estimated at several billions of dollars a year, chemical manufacturers have spent large sums to develop improved coatings for metal products.

G-E's R-108 is an example of the improved coating chemicals that have come out of industrial laboratories as the result of post World War II research. The new material, an intermediate, is used as an ingredient in coating formulations to impart alkali and acid resistance.

Ordinary steel chemical processing equipment coated with a finish containing R-108 can be substituted in

Compact Ross exchangers eminently satisfactory for hydraulic power units

. . . says Rucker

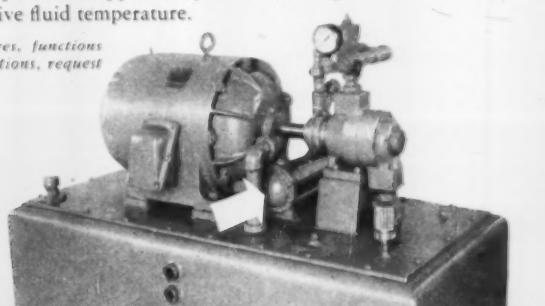


To guard against pump slippage and lost capacity, The Rucker Company, Oakland, California, furnishes Ross Exchangers as built-in components on its hydraulic power units.

Besides favoring their compactness, which is extremely important in this type of installation, Rucker has this to say: "We have used a number of Ross Exchangers on our hydraulic power units, which we design specifically for fluid power transmission systems, and have found them eminently satisfactory."

All of which means: Whether your hydraulic power unit, like Rucker's, is designed for conveyor driving, lifting equipment, hoisting or lapping machine applications, or whether it is used to drive hydraulic presses, injection molders, die casting and other machines, you too will find fully standardized, all-copper and copper alloy Ross Exchangers the best safeguard for safe, effective fluid temperature.

★ *For details on features, functions and diversity of applications, request Bulletin 1.1K4.*



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Life-Line motor
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Cut motor failures with these two

Don't take our word for it. Here's what users of Life-Lines say: "We always have had bearing failures on our pump motors. It was quite an expense in repair costs and down time. Since we installed Life-Line motors, we have had no down time . . . no failures. We now standardize on Life-Lines."

Another user reports: "Our former starters employed solder pot mechanisms. Much trouble was experienced. Since we've switched to Life-Linestarters,® our troubles are gone. The operation of the bimetallic disc is positive."

These reports are two of several hundred such reports resulting from the new kind of dependability built into the Life-Line motor and Life-Linestarter.

Life-Line Motors

Steel frame . . . adds strength, cuts weight.
Pre-lubricated bearings . . . no greasing.
Improved windings . . . lengthen electrical life.

Life-Linestarter

Bimetallic disc . . . calibration unaffected by aging or oxidation.
Servicing is simple . . . all parts removable. Screw driver only tool required.

Get the advantages of these two—your best bet to cut motor failures. Ask your Westinghouse representative for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21644

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The fact that *so many* manufacturers find there are Pheoll stock fasteners that meet exact needs—makes Pheoll stocks the *one source* for you to depend on, too. Our wide range of sizes, metals and finishes simplifies assembly problems; speeds production—because fasteners that fit, make jobs go faster!

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many applications for expensive and hard-to-get alloys. Finishes for the interiors of metal drums can be made that are highly flexible and give steel drums longer life.

G-E engineers say the material shows promise in replacing tin used in food containers.

Truck Operation Costs Are Low

Power trucks tie in directly with manufacturing operations at an asbestos pipe plant in Latin America. A truck made by Elwell-Parker Electric Co., Cleveland, and equipped with low-lift platform 12 feet long, 20,000 pounds load capacity, is transporting pipe on steel cradles to and from autoclaves. Load dimensions are 180 x 60 x 60 inches, weights vary from 16,000 to 21,000 pounds. Truck has been in service 24 hours a day, six days a week for 28 months.

Another low-lift platform truck of 10,000 pounds capacity has worked continuously within the plant for 35 months. Their combined service record is 63 truck-months. Of special interest is the fact their total maintenance cost for parts and tires has averaged only $3.36 per month, or 85 cents per month exclusive of tires. A third low-lift platform truck is being installed.

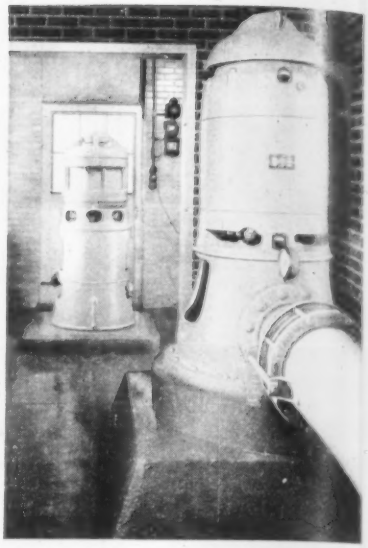
Turnbuckles Flame Cut

Oxyacetylene torches are being used to rough out turnbuckles from bar stock by Marine Iron Works, Tacoma, Wash. Cut bars are then heated in a furnace, spread apart by wedge-shaped dies and threaded for eye bolts. Two Oxweld C-56 blowpipes mounted on a CM-30 cutting machine are used to do the job. Each blowpipe is equipped with a two-nozzle adaptor so that four cuts are made simultaneously.

A special jig holds eight lengths of 1½-inch round bar, 22 inches long in two rows of four bars. The first four bars are cut and while the second group is being cut the operator unloads and loads the other half of the jig. Cutting time for the eight bars, including downtime for flame adjustment and nozzle cleaning is 5 minutes.

Light Rays Toned Down

Absorptive safety glasses for people whose eyes are especially sensitive to light rays are available. Glass was developed by Bausch & Lomb Optical Co., Rochester, N.Y., at the request of Soft-Lite Lens Co., New York. The glasses are designed for dress as well as safety wear. Ac-



BEATRICE, NEBRASKA

UPS WATER SUPPLY

With a Layne Short Setting Booster Pump

From four Layne Well Water Units, Beatrice, Nebraska was putting 1600 gallons of water per minute into the city through the six miles of 14 inch mains. Growth of population and new industries created a need for more. The problem was easily, quickly and economically solved by installing a Layne Short Setting Booster Pump in line with the wells. As a result, water supply was increased to 2,380 gallons per minute—nearly 41 per cent.

The Layne 2-stage, 15 inch bowl booster pump, powered with a 100 H.P. motor was easily accommodated in a small pump house addition, thus saving the cost of extra heating equipment. Installed in 1948, it is giving highly satisfactory service.

These Layne Short Setting booster pumps may be used by other cities—and factories as a means of increasing water supply at a very nominal cost.

If you are in need of more water either from your present wells, or from new units, Layne engineers will gladly survey your present equipment and make dependable recommendations. For futther information, catalogs, etc. address

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He's the Handy & Harman field service engineer. You'll like him because he really knows his stuff. He was hand-picked and specially trained for the job. He is a friendly chap with a wide background of experience that covers both domestic and war time production. He loves to take off his coat and get his hands dirty — and he's an artist with a torch. Give him a brazing problem and he's a bulldog — he'll never let go until it's licked. And if it's too tough to lick on the spot, he's backed by the top-ranking and most experienced Research and Engineering staffs in the business — originators of the well known low-temperature silver brazing alloys EASY-FLO and SIL-FOS. He's ready and eager to give you the following services — without cost or obligation.

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EMPLOYEE TRAINING — either in H&H silver alloy brazing school — or by a program set up in your own plant.

TECHNICAL BULLETINS — making available the technical facts and data on silver alloy brazing as developed in our Research Laboratory.

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HERE'S THE BULLETIN to give you full facts

This new 28-page Bulletin 20 gives the whole remarkable EASY-FLO and SIL-FOS brazing story — including useful information on joint design and fast heating and production methods. It's a "must" for all who design or produce metal assemblies. Write for a copy today.

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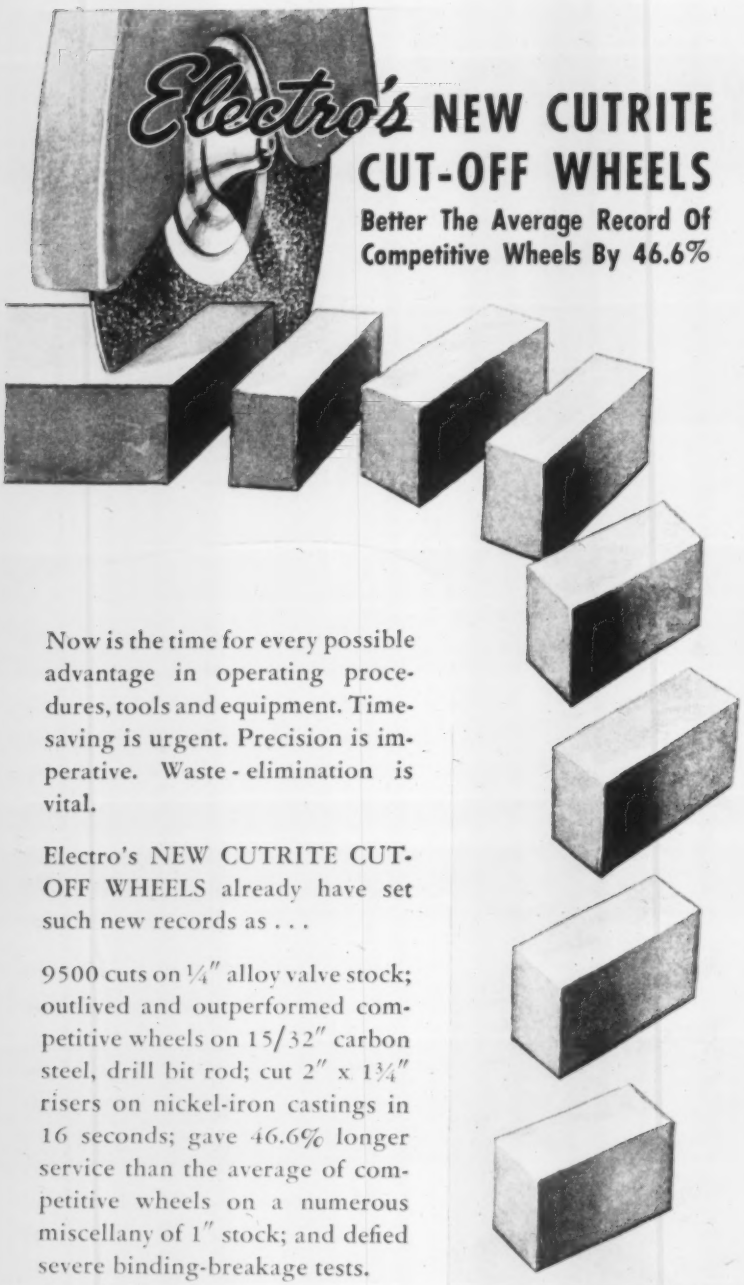

Electro's NEW CUTRITE CUT-OFF WHEELS

Better The Average Record Of Competitive Wheels By 46.6%

Now is the time for every possible advantage in operating procedures, tools and equipment. Time-saving is urgent. Precision is imperative. Waste - elimination is vital.

Electro's NEW CUTRITE CUT-OFF WHEELS already have set such new records as . . .

9500 cuts on ¼" alloy valve stock; outlived and outperformed competitive wheels on 15/32" carbon steel, drill bit rod; cut 2" x 1¾" risers on nickel-iron castings in 16 seconds; gave 46.6% longer service than the average of competitive wheels on a numerous miscellany of 1" stock; and defied severe binding-breakage tests.

Write, wire or *phone* for a competent Field Engineer to prove these new wheels on *your* jobs. Also, if you need it, to help with problems of rough grinding like snagging and precision work like roll grinding.

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cording to the optical firm, the flesh-colored lenses which can be readily hardened possess all the neutral absorption properties and transmission qualities of standard Soft-Lite lenses.

Chemical Dangers Reduced

Protection against chemicals used industrially in either closed or open systems is afforded with Gra-Lite safety clothing made by Standard Safety Equipment Co., Chicago. Clothing is coated with Geon resin, a product of the B. F. Goodrich Chemical Co., and protects against the action of red fuming nitric acid and other inorganic acids, also alkalies, salts, hydrocarbons, amines and strong oxidizing agents.

Material is light in weight and gray in color, providing excellent sunlight reflection which makes the garments cool and comfortable to wear. Its extreme chemical resistance is maintained sufficiently long to enable a worker splashed with an injurious chemical to wash himself before damage occurs. Excellent abrasion resistance is another feature.

Metallurgists Must Pioneer

Restrictions on use of critical alloying elements in steel, likely to be a problem for years to come, will force engineering graduates to pioneer new fields of metallurgy rather than depend upon the formulas of the past, if the problem of keeping U. S. industries at present efficiencies is to be solved, says John J. B. Rutherford, metallurgist, the Babcock & Wilcox Tube Co., Beaver Falls, Pa., in addressing an ASME student group at Pennsylvania State College. With the threat of a continuing armament program, he cautioned that embryo metallurgists have a double responsibility not only for finding substitute alloys to replace those required by the military, but also for discovering new elements to advance the field of engineering.

Scarce Metals, Money Saved

Salvage jobs that saved users thousands of dollars in materials and production time in addition to conserving scarce metals are described in *Metco News*, published by Metallizing Engineering Co. Inc., Long Island City, N. Y. Defective motor blocks are saved by an automotive manufacturer with a production metallizing setup, previously many were scrapped because of porosity and consequent leakage of water. Now they are grit blasted, metallized with 0.020-inch of copper and given

a flash coat of Sprairon for appearance. In extreme cases where the leaking area is actually spongy, it is preheated with a torch to 400°F before spraying with copper. When the cast iron cools, it shrinks around the copper making it impervious to water.

A company engaged in freight hauling in New England uses metallizing to maintain operating equipment including 95 tractors, 200 trailers, 93 trucks and 15 service wagons. Major repair operations are: Salvage of banjo rear axle housings, wheel spindles and brake cams. Company saves about $250 per axle housing.

Federated Metals Develops Tin-Conserving Solders

Development of a group of solders which permits savings of 50 per cent or more in the tin normally used for solders was announced recently by the newly-formed metals conservation committee of Federated Metals Division, American Smelting & Refining Co., New York. Extensive research devoted to this project indicates that silver is the only metal readily available in volume that can be satisfactorily substituted for part of the tin in solder. There is virtually no loss in working efficiency and cost is less than that of the alloys they are designed to replace.

The new tin-conserving solders are basically silver-tin-lead alloys as compared with the usual tin-lead variety. The addition of a small percentage of silver permits a marked reduction in the tin content at the same time giving a joint at least as good as that given by the original alloy. This solder group is an outgrowth of a similar series of solders developed and produced by Federated Metals Division during World War II.

According to A. J. Phillips, director of research, such a typical application as joining sheet metal—in heating or air conditioning work for example—the new ST-30 (30 per cent tin) solder performs as well as the commonly used 50 per cent tin-50 per cent lead or 40 per cent tin-60 per cent lead solders. Generally, where 35/65 is used in soldering end seams in can manufacture, ST-25 is considered satisfactory. In the case of sealing milk cans, 30/70 is generally used, but satisfactory results can be achieved with ST-20N. In radio and television tube manufacture, ST-20N can be used in place of solder with much higher tin content.

The same fluxes can be used as heretofore, and the identical means of application are satisfactory. ST solders do require slightly more heat to melt, but this is compensated for by the fact that too much heat is not as harmful as it is to the usual tin-lead solders.

Quality Control Course

June 19-29 the college of engineering at the University of Colorado will conduct an intensive training course in statistical quality control. The course will include acceptance sampling and other industrial statistical methods used in industry.

Application or further information about the course can be obtained by writing John F. Wagner, College of Engineering, University of Colorado, Boulder, Colo.

Combustion Studies Available

Combustion control case histories of five companies are available from Hays Corp., Michigan City, Ind. Each report is devoted to a complete discussion of the experience of one company with combustion control.

Case histories include: 1. Problems facing boiler plant personnel before installing control, 2. specific condi-

DUMPS BOTH WAYS

SAVES IN ALL DIRECTIONS

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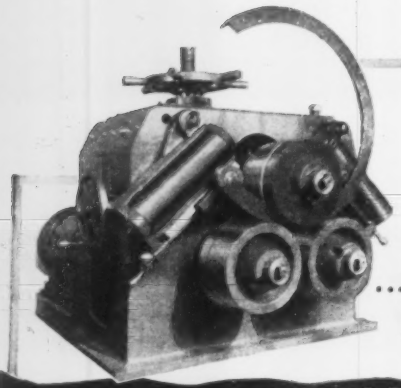

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1 angle to roll,
you won't need it!

...BUT FOR PRODUCTION ROLLING, IT'S A "MUST"

THOMAS ANGLE-BENDING ROLL

Obviously one, two, six or even sixteen angles won't justify the purchase of this modern Thomas machine. But if your production calls for circles or segments from angles, flats, rounds or other shapes in quantities, the THOMAS ANGLE BENDER may be the solution to *your* need for *greater production at less cost! Write for Bulletin 314.*

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17

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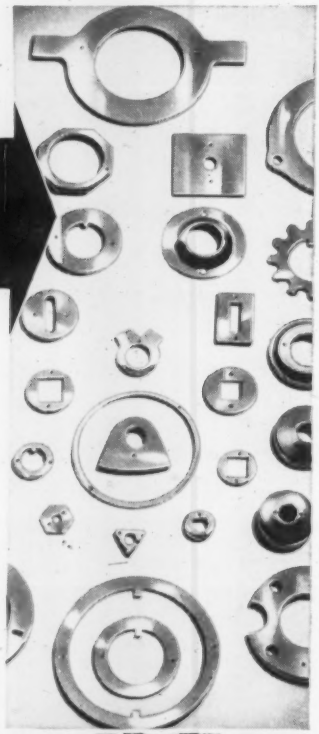

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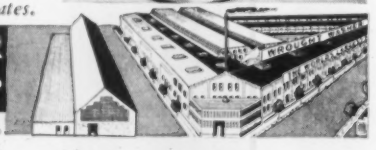
Large volume production, the most advanced methods and facilities, plus more than 60 years of continuous experience in the manufacture of Washers, are factors that enable us to offer you top quality washers and stampings at competitive costs. Over 22,000 sets of dies for making Washers of every type (Standard and Special), from every type of material, for every purpose, in any finish. STAMPINGS of all descriptions; Blanking, Forming, Drawing. *Submit your blueprints and quantity requirements for estimates.*



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The World's Largest Producer of Washers
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tions (load swings, steam demand, boiler rating, products produced, etc.) existing at the plant, 3. how the control system operates together with a discussion of related boiler plant equipment and 4. results obtained with automatically controlled combustion. A schematic diagram and photographs are included in each report to facilitate understanding of the installation.

Wire Mesh Belt Unloads Gears

An automatic unloading attachment for rotary gear shaving machines introduced by Michigan Tool Co., Detroit, converts the machines to automatic unloading at low cost. It can be attached to any of the company's 870 or 870A automatic gear finishers in any of several positions. No changes in the machine are necessary except to drill and tap a few holes for mounting brackets and the discharge chute.

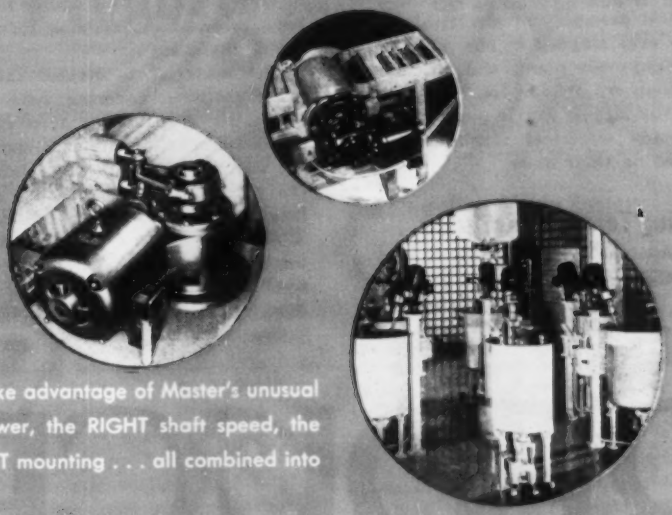
Unloader consists of a small wire mesh belt which travels over two drums and is driven by a low horsepower electric motor. Since the belt moves at a relatively slow constant speed it permits cutting fluids to drain back into the machine before the gear is discharged into the collecting pan. The belt has a certain amount of give which prevents damage to the finished gear either from striking a conventional metal chute or another gear. Belt is not damaged by the cutting fluid and has a long life expectancy.

Labels for Flow Lines

A new method of marking fuel, oil and hydraulic lines at low cost, originally perfected for use in aviation, is now being adapted for the same purpose in marking compressed gas, coolants, oxygen, air, water, fire, chemical and other flow lines in general industrial use. It involves labels, as developed by the E-Z Code Division of the Western Lithograph Co., Los Angeles, which are pressure-sensitive and are applied with finger-tip pressure. Fluid line markers are available in standard symbols and codes and can be produced to size and printing specifications.

Ships 78-Ton Power Package

A 157,000-pound "packaged" power plant, mounted as a single unit on a special low-bed railroad car, recently rolled out of the Westinghouse Electric plant at Sunnyvale, Calif., bound for Georgia. Comprising steam condenser, steam turbine and electric generator, the unit will go into service soon to add 5000 kilowatts to the



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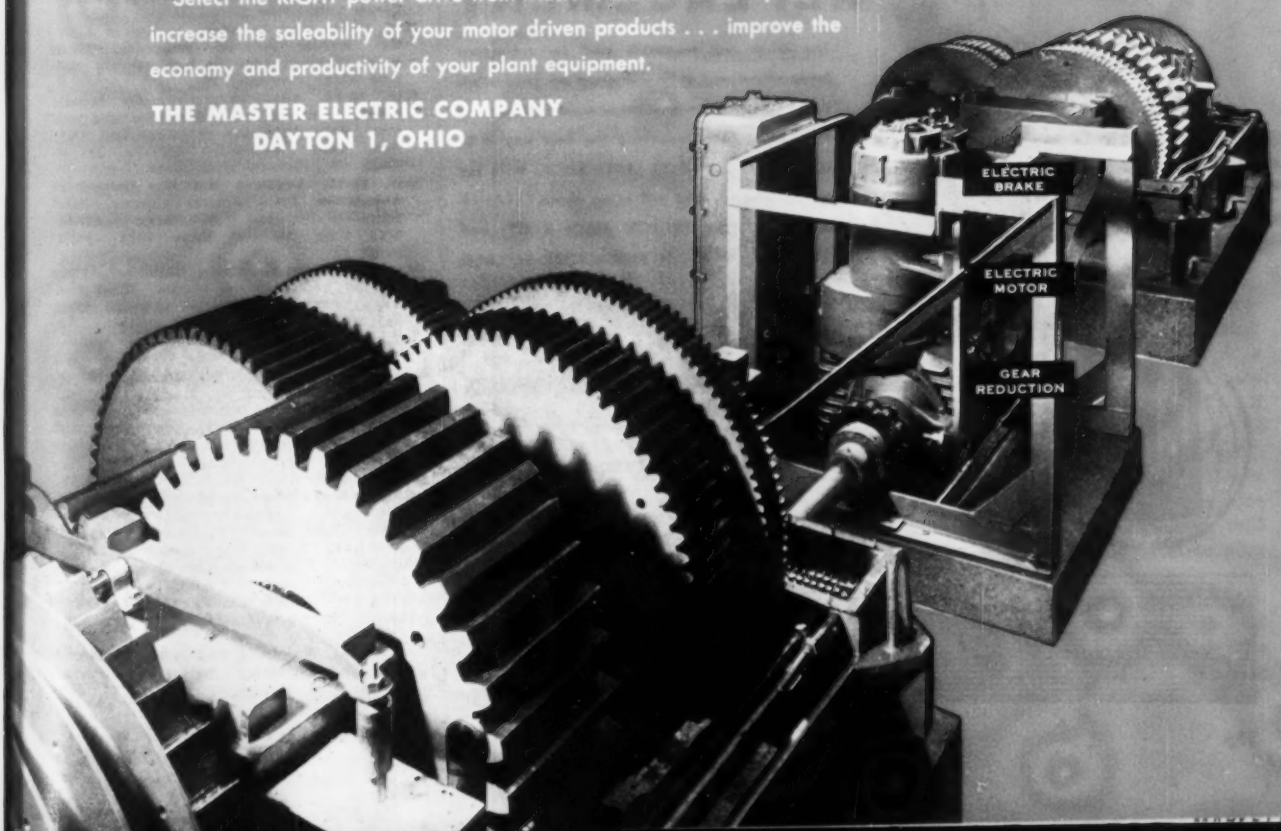
Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

little ones or BIG ones

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



power supply of the city of Thomasville, Ga. It was the largest and heaviest assembly of electrical apparatus ever shipped in one piece from the Sunnyvale plant, and officials of the Southern Pacific Railroad believe it is the largest single piece of western-made electrical machinery ever carried on their lines.

Forging Textbook Reissued

Seven years ago, Chambersburg Engineering Co., Chambersburg, Pa., with the co-operation of the school of engineering, Princeton University, prepared a course on the principles of drop forging. This course has just been reissued in textbook form with minor revisions.

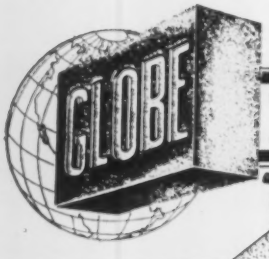
The material is divided into five main sections, covering reasons for producing a part by drop forging, characteristics of the principal metals used in drop forging, details of the machinery for producing a drop forging, basic rules to be followed in designing a part for drop forging, sequence of steps from bar stock to final forging, basic principles of die design, and drop forging manufacturing tolerances.

REDUCE LOST TIME

due to REFRACTORY REPLACEMENT

The labor and materials used for refractory replacement are a terrific drag on production time. You can retrieve these wasted hours by eliminating the cause—and the best way is to USE GLOBE SUPERIOR LADLE BRICK. Wire cut or dry pressed, they will bring about CLEANER STEEL, LOWER PER TON BRICK COST, and SAVE TIME LOST IN REFRACTORY REPLACEMENT.

SERVING THE STEEL INDUSTRY SINCE 1873



The GLOBE Brick Co.

EAST LIVERPOOL, OHIO

CALENDAR OF MEETINGS

† *Denotes first listing in this column.*

Mar. 5-7, Hydraulic Institute: Quarterly meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Calif. Institute address: 122 E. 42nd St., New York.

Mar. 5-7, Manufacturers' Standardization Society, Valve & Fittings Industry: Annual meeting, Commodore Hotel, New York. Society address: 420 Lexington Ave., New York 17.

Mar. 5-9, American Society for Testing Materials: Spring meeting, Cincinnati. Society address: 1916 Race St., Philadelphia.

Mar. 6-8, Society of Automotive Engineers: Passenger car, body and materials meetings, Hotel Book Cadillac, Detroit. Society address: 29 W. 39th St., New York.

Mar. 7, Bituminous Coal Research Inc.: Annual meeting, Deshler-Wallick Hotel, Columbus, O. BCR address: 2609 First National Bank Bldg., Pittsburgh 22. (meeting postponed from Feb. 7).

Mar. 15-17, American Society of Training Directors: Annual conference, Bellevue Stratford Hotel, Philadelphia. Convention address: Allegheny & 19th Sts., Philadelphia 32.

Mar. 12-14, American Roadbuilders Association: Annual meeting and national defense conference, Hotel Schroeder, Milwaukee. Association address: 1319 F St., Washington 4.

Mar. 12-15, National Electrical Manufacturers Association: Meeting, Edgewater Beach Hotel, Chicago. Association address: 155 E. 44th St., New York 17.

Mar. 13-16, National Association of Corrosion Engineers: Conference and exhibition, Statler Hotel, New York. Conference committee address: P. O. Box 6120, Philadelphia 15.

Mar. 14-17, American Society of Tool Engineers: Annual meeting, Hotel New Yorker, New York. Society address: 10700 Puritan Ave., Detroit 21.

Mar. 19-20, Liquefied Petroleum Gas Association Inc.: Convention and trade show; directors' meeting, Biltmore Hotel, Atlanta. Association address: 11 S. La Salle St., Chicago 3.

Mar. 19-21, National Association of Waste Material Dealers: Annual meeting, Stevens Hotel, Chicago. Association address: 1109 Times Bldg., New York.

Mar. 19-21, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15.

Mar. 19-23, American Society for Metals: Seventh western metal exposition and congress, auditorium and exposition hall, Oakland, Calif. Exposition address: 215 S. Clark Dr., Beverly Hills, Calif.

Mar. 21-22, American Hot Dip Galvanizers Association Inc.: Annual meeting, Hotel Biltmore, Atlanta. Association address: 2311 First National Bank Bldg., Pittsburgh 22.

Mar. 22-23, Pressed Metal Institute: Spring meeting and technical session, Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20.

Apr. 2-3, Diamond Core Drill Mfrs. Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 122 E. 42nd St., New York.

Apr. 2-4, American Institute of Mining and Metallurgical Engineers: Open hearth and blast furnace, coke oven and raw materials conference, Statler Hotel, Cleveland. Institute address: 29 W. 39th St., New York.

†**Apr. 8-12, American Hardware Manufacturers Association:** Spring convention, Biltmore Hotel, Palm Beach, Fla. Association address: 342 Madison Ave., New York 17.

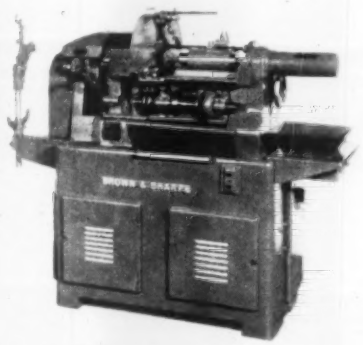
†**Apr. 10-11, Westinghouse Machine Tool Electrification Forum:** Westinghouse Electric Corp., sponsor, William Penn Hotel, Pittsburgh. Forum address: 306 Fourth Ave., Pittsburgh 30.

†**Apr. 10-11, Society of Automotive Engineers:** Annual earthmoving industry conference, Peoria, Ill. Society address: 29 W. 39th St., New York.

New Products and Equipment

Opposed Spindle Machine

An opposed spindle automatic cut-off machine made by Brown & Sharpe Mfg. Co., Providence 1, R. I., supports and drives the work at both ends, permitting cutting off the piece without leaving any teat and eliminates second operation. Hole through the largest regular-capacity feeding



finger, is ⅜-inch in diameter. Single movement of feeding mechanism feeds any length to 1 inch, greater lengths to 4½ inches are fed by successive movements.

Driving motor is 2 hp and mounts on an adjustable bracket on the base of machine under tank table, enclosed by louvered guards. Drive to work and opposed spindles is through V-belt to shaft in base, thence through change gears and flat belts to spindles. Spindle is mounted on precision antifriction bearings at front and rear, running in boxes which are supported in bed of machine. Bearing surfaces of spindles are hardened, ground and lapped. Range of spindle speeds is 5000 to 454 rpm, 16 speeds are provided.

Check No. 1 on Reply Card for more Details

Space Saving Power

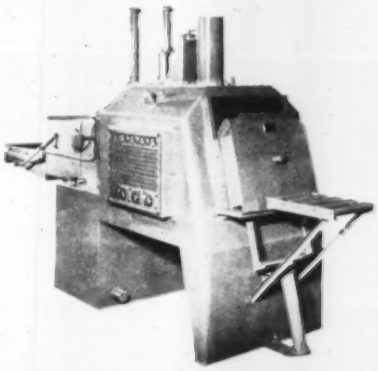
A midget load center unit substation designed for low-voltage, regulated alternating current lighting and power service is announced by Unit Equipment Division, General Electric Co., Schenectady 5, N. Y. It is called an Inductrol power pack and incorporates in one steel housing an air circuit breaker, a dry-type transformer and an air-cooled induction regulator.

Unit is available in either single or three-phase ratings and has a capacity ranging from 15 to 100 kva with incoming circuit rated at 480 or 600 v, 60 cycles and a regulated output at 120/240 or 208Y/120 v. In addition to serving lighting requirements the power pack can be used to regulate the power supplied to resistance heating and infrared heating equipment, electronic apparatus, precision instruments and control circuits.

Check No. 2 on Reply Card for more Details

Flexible Furnace Unit

A semiautomatic controlled atmosphere unit for bright heat treating, rated at 100 pounds per hour is the T-100-E made by Ipsen Industries Inc., 715 S. Main St., Rockford, Ill. Hearth is 12 x 18 x 10 inches. Maximum operating temperature is 2100°F. Unit is designed for bright heat treating, carburizing, carbonitriding, annealing, and copper brazing. For production copper brazing, additional cooling chambers are available.



Unit consists of a furnace sealed to a combination cooling chamber and quenching tank. Work is manually loaded into the furnace and transfer from the furnace to the cooling or quenching section is done without breaking the atmosphere seal. Furnace is electrically heated, using eight bars for 16 kw input. Cooling chamber is water jacketed with automatic temperature control.

Check No. 3 on Reply Card for more Details

Punch Press Improved

Benchmaster Mfg. Co., 2952 W. Pico Blvd., Los Angeles, Calif., has added several improvements to its 4-ton deep throat punch press. Open height, ram up, is increased to 8 inches permitting use of higher dies and special tooling.

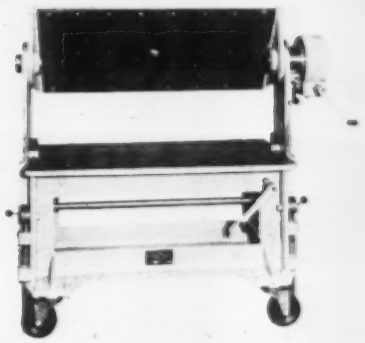
The press punches to the center of an 18-inch circle. Frame construction has been strengthened at all stress points and a knock-out is added. With the exception of the frame, trip link and legs, all parts have been standardized and are interchangeable with the regular 4-ton model.

Check No. 4 on Reply Card for more Details

Die Handling Made Easier

A die handler developed by the Morley Machinery Corp., 1239 University Ave., Rochester 7, N. Y., can be used for die handling and taking apart of heavy dies or for taking a die apart for inspection. In the assembly of the die it does away with the cumbersome block and tackle procedure.

It will handle dies up to 24 inches wide, 43 inches long, shut height from 9 to 14 inches and weight up to 1 ton. Upper platen which has a 20 by 42-inch area has a vertical travel of 16½ inches. It is mounted on heavy hardened steel trunnions running in antifriction bearings and may be rotated 360 degrees by the upper hand crank. A locking pin may be used at five of the most convenient



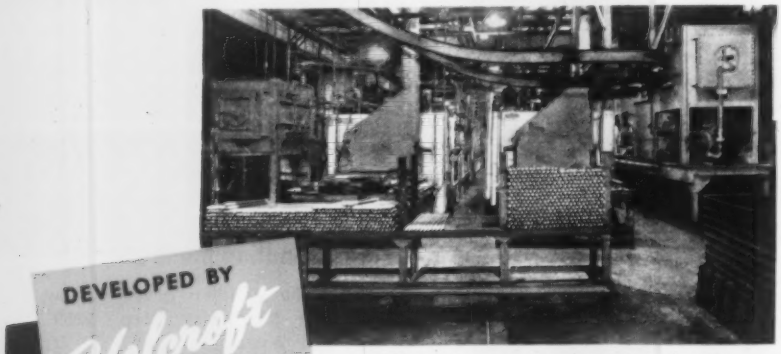
angular positions. Four cam operated legs are provided to raise the machine off the floor and level the work for machining or drilling.

Check No. 5 on Reply Card for more Details

Lubricant Dispenser

Compact and maneuverable two-wheeled grease rig for dispensing lubricants to industrial bearings is announced by Gray Co. Inc., Graco Square, Minneapolis 13, Minn. All grease and oil equipment on the rig is removable, permitting the servicing of remotely located machines inaccessible to the cart. This service is a completely self-contained unit requiring no air line or electric plug in.

Two models are available: One dispenses grease from a bucket-type unit which holds 30 pounds of grease, the other pumps from a 25 to 40-pound



These two non-scaling, non-decarburizing furnaces were installed 17 years ago . . .

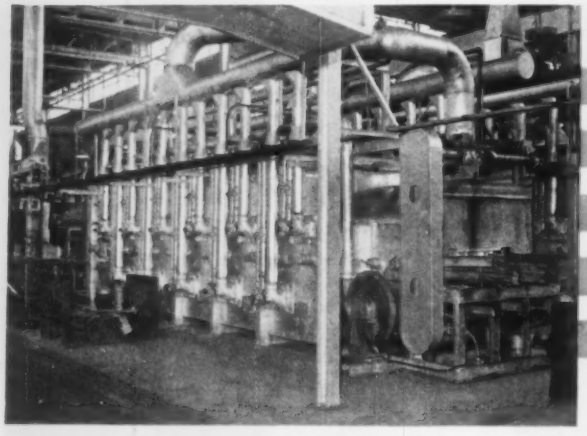
These CARBON-CONTROL FURNACES are still going strong today

Industry's first non-decarburizing furnaces for high carbon steel were built by Holcroft in 1934 . . . and are still in service today!

Since then, Holcroft research has been responsible for many more developments in the field of controlled atmosphere hardening. These Holcroft advantages are so well-known that almost all modern carbon-control furnaces follow the principles established by Holcroft engineers.

Other Holcroft furnaces are hanging up production records, too. If you have any kind of a heat treat problem, you can tap this fund of metallurgical know-how by writing today.

. . . one of three radiant tube furnaces recently built for the same customer.



BLAZING THE HEAT TREAT TRAIL

SINCE 1916 Holcroft AND COMPANY

BUILT BY HOLCROFT & COMPANY DETROIT, MICH.

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

6545 EPWORTH BLVD. DETROIT 10, MICHIGAN

CHICAGO 9 — C. H. Martin, A. A. Engelhardt, 4209 South Western Blvd.
CLEVELAND 15 — Wallace F. Schott, 1900 Euclid Avenue
HOUSTON 1 — R. E. McArdle, 5724 Navigation Blvd.
CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

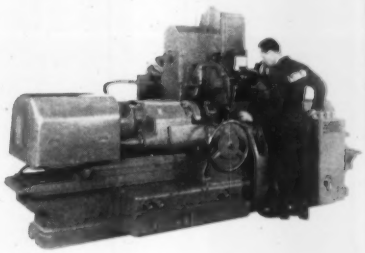
refinery filled pail. Each has a 10-foot pressure hose with control valve. Also included in the cart are an oil pump with a 10-foot dispensing hose and gun, a 1-pound lever gun, and a ½-pint, pistol oiler.

Check No. 6 on Reply Card for more Details

Crank Pin Grinder Refined

An improved crank pin grinding machine is being produced by Landis Tool Co., Waynesboro, Pa. Designated as type DH crank pin grinding machine, it is available in swings of 16 or 25 inches and in lengths to accommodate 32, 42, and 72-inch crankshafts.

Lubrication to the carriage and wheelbase ways is from a separate reservoir with pump and filter. A safety pressure switch prevents operation of the machine unless pressure exists in the system. If pressures fails the motors stop. Telescoping covers keep the hand scraped ways protected regardless of the carriage position. A sensitive hand feed for the carriage is used for positioning the crankshaft laterally as the grinding wheel moves toward the work. This permits even grinding on each side of the crankshaft sidewall. Speeds of the hydraulic traverse are adjustable at the front of the machine. There are separate controls for positioning speed of the carriage and for both right and left hand cushioning speeds.



Check No. 7 on Reply Card for more Details

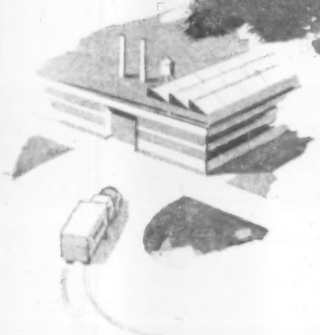
High Output Tube Mill

Designed and developed by American Roller Die Corp., 20510 St. Clair Ave., Cleveland 17, O., the Ardcor model 1½ F lock seam tube mill produces 30,000 feet of 2-inch diameter (0.049 wall) lock seam tubing per 8 hour day. Each pair of roll spindles is contained in one separate housing complete with speed reducer, facilitating removal or installation of additional units. This feature makes it possible for the customer to purchase any length base and incorporate additional units as the need arises.

Units are built with Ardcor universal gearing arrangements permit-

This man...

IS YOUR HELPER!



There is a man in your community who stands at your elbow to instantly supply the tools, materials, parts and equipment you may require in production and maintenance operations of your factory —upwards of 10,000 different products from abrasives to zinc sheets.

What a time-killing task it would be to procure all these items from their infinitely various original sources. How economical and convenient it is simply to phone this man, tell him what you want and know that, often within a matter of minutes, it will be in your receiving department.

Accessible

"This man" is an industrial distributor* or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

* There are approximately 2000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $5,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

Bunting®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

For repetitive cutting . . .

THIS COMBINATION SAVES TIME AND MONEY

Wells No. 12 Metal Cutting Band Saw and *Wells-O-Bar* Feed Master

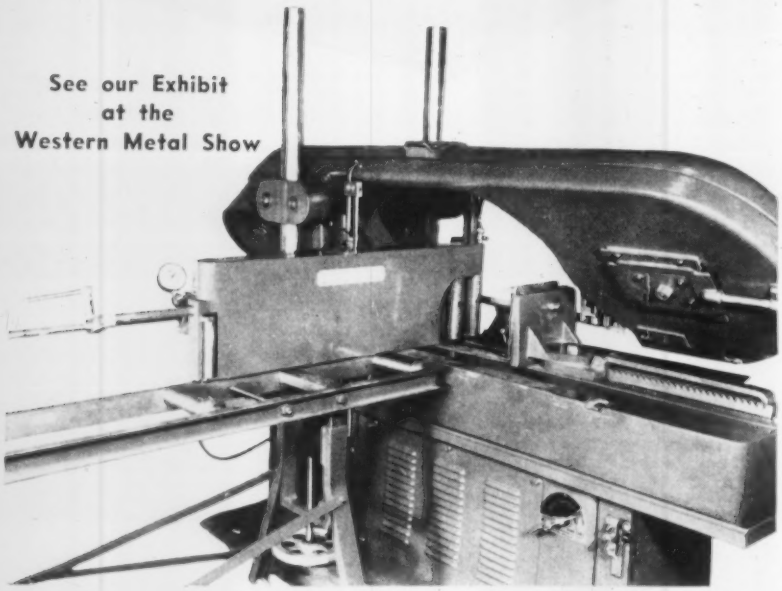
ANY quantity of identical lengths of bar stock are cut automatically in a Wells No. 12 Heavy Duty Metal Cutting Band Saw equipped with a Wells-O-Bar Feed Master.

In operation, the cutting head of the saw descends at a rate governed by a predetermined blade pressure setting. At the completion of each cut, the head automatically rises to a preset height and the stock is automatically projected for the next cut. The machine requires no attention except for reloading. The saw is powered by two electric motors (3/4 and 1/3 H.P.); the feed requires air at 60 to 80 psi. Capacity of the saw is 12¾" O.D. for rounds, 12" x 16" rectangular; standard feed will project up to 17".

The feed mechanism does not interfere with the use of the saw for making single cuts. Saw and feed can be purchased separately or as a combination. The feed unit can easily be attached to horizontal band saws now in service.

Ask your Wells Dealer for complete information or write direct.

See our Exhibit at the Western Metal Show



Wells Saws

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

ting the use of different diameter top rolls by raising the top spindle through an adjusting screw. Throughout the entire range of adjustment spur gears are kept in perfect mesh and both spindles maintain a parallel relationship.

The welded steel base houses the entire drive mechanism. A built-in soluble oil coolant tank is supplied with a fractional horsepower coolant pump. Both the coolant pump and the Hi-torque drive motor are thus assured every protection. All electrical controls are mounted on the front side of the base.

Check No. 8 on Reply Card for more Details

Geared Motors Improved

An improvement on its Slo-Speed geared motors is announced by Sterling Electric Motors Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22, Calif. Motors are of the single reduction Klosd-Tite construction for atmospheres containing nonexplosive dusts, vapors and injurious foreign materials. An external fan forces cooling blasts of air over the streamlined case.

Output shaft ratings are the six AGMA speeds starting at 780 rpm down to and including 280 rpm. This motor, type FWFA, is totally enclosed and includes labyrinth seals, liberal heavy duty ball bearings lubricated for life, and the Sterling patented herringbone rotor. Motor can be mounted in any position without modification.

Check No. 9 on Reply Card for more Details

Pistol-Type Drill

A Desoutter portable electric drill gun, model S2, with a ¼-inch capacity is announced by Newage International Inc., 235 E. 42nd St., New York 17, N. Y. It weighs 2½ pounds and operates at 1600 rpm. It consumes 180 watts and can be used on any alternating or direct current supply of appropriate voltage.

Balanced armature is vacuum-impregnated, and runs on preloaded ball bearings which automatically maintain their adjustment. Armature is hand former wound using silk taped coils.

Check No. 10 on Reply Card for more Details

Makes Precise Measurements

A machine for precision measurements with direct optical reading to 0.00005-inch without the use of micrometer screws, is available from Hauser Machine Tool Corp., Manhasset, N. Y., factory representative of Henri Hauser Ltd., Switzerland.

It is designated as type P324 and gives direct optical reading of measurements in graduations of 1-inch, 0.1-inch, etc.

Microscopes for reading longitudinal and transverse travel have a magnification of 100X and measuring microscope which is interchange-

able with goniometer has a magnification of 45X. Machine stand is 31½ inches wide, 26 inches deep and 27½ inches high. Electrical supply required is single-phase lighting current from 125 to 220 volts.

Check No. 11 on Reply Card for more Details

Motor Line Expanded

Janette Mfg. Co., Chicago, Ill., expanded its gear motor line by adding ventilated integral hp motors. Company now makes ventilated, enclosed and totally enclosed fan-cooled types of gear motors. Single phase type motors are available in 1 hp and smaller ratings, polyphase and direct current motors are available through 7½ hp. Company will soon make available integral horsepower class 2 gear motor for use in explosive atmospheres.

Six types and sixteen sizes of gear boxes can be furnished with motors. These gear boxes include gear combinations for either single or double reduction and for either worm gear or combination worm-and-planetary gears.

Check No. 12 on Reply Card for more Details

Quick Conversion Press

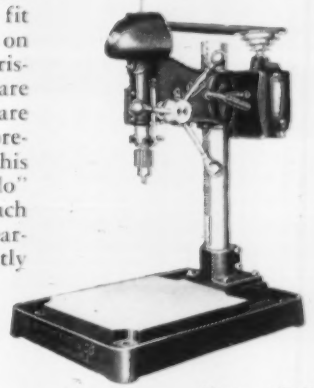
Production of a 4-in-1 four ton punch press is announced by Kenco Mfg. Co., 5211 Anaheim-Telegraph Rd., Los Angeles, Calif. Features of the new press include a deep, 12¾-inch throat, a sturdy 400-pound cast frame and patented clutch drive dog built into the clutch collar instead of a slot in the crankshaft. This last feature was engineered to eliminate weakening the one-piece shaft by

"SHEAR" ACCURACY at Production Speed!

"Buffalo" DRILLS ON THE JOB AT J. WISS & SONS, CO.

J. Wiss & Sons symbolize fine precision work in the shear-maker's art. Above is one operation in making Wiss pruning shears—reaming the hole to fit the holding bolt. Here, Wiss insists on very close tolerance. It is not surprising that "Buffalo" No. 15 Drills are used. These drilling machines are known to industry for their rigid, precision construction which fosters this kind of accuracy. Investigate "Buffalo" spindle construction, too—see how each spindle runs smoothly on two ball bearings, and see how it is held tightly against end play.

These rugged "Buffalo" No. 15 Drills are just as well known for their easy, speedy handling that eats up big stacks of work in a day. WRITE FOR FACTS, stating your particular operation.



Above, "Buffalo" single spindle No. 15 bench model drill press. Available, also in floor and multi-spindle models, to suit your set-up.

"Buffalo"

BUFFALO FORGE COMPANY

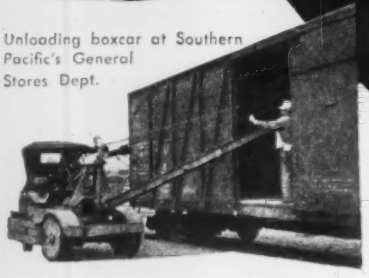
158 Mortimer St. Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING CUTTING SHEARING BENDING

Heavy Industries Use KRANE KAR SWING-BOOM MOBILE CRANE to Cut Costs by Handling Loads Easier, Faster, Safer

Stacking fittings at a Los Angeles Public Utility



Unloading boxcar at Southern Pacific's General Stores Dept.

Handles tubes and heavy equipment at the Wilmington Refinery of the Union Oil Company

Gas or diesel, 12 to 37 ft. booms, or adjustable telescopic booms; solid or pneumatic rubber tires. 1½, 2½, 5, and 10 ton cap. Buckets, magnets, all-weather or foldable tops, and other accessories available.

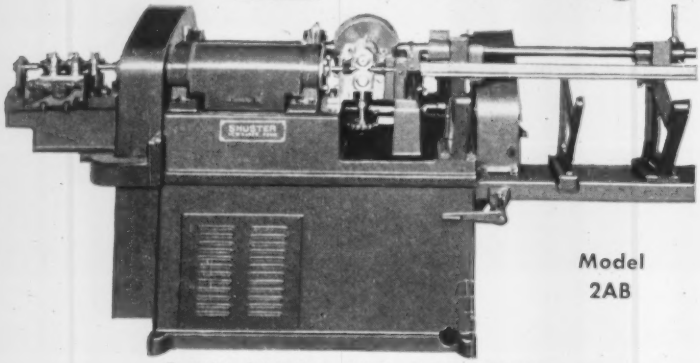
WRITE FOR BULLETIN NO. 79

SILENT HOIST & CRANE CO. 849 63rd ST., BROOKLYN 20, N.Y.

This New, Economical

SHUSTER

Cut Costs AND Accurate Lengths!



Model 2AB

Capacity: 3/16" dia.—⅜" dia. (BASIC WIRE)

Automatic

WIRE STRAIGHTENING AND CUTTING MACHINE

This new "SHUSTER"—with its five gear-driven straightening rolls—handles even badly twisted wire with ease. Square and rectangular as well as round wire may be straightened and cut to exact lengths. Other "Shuster" features that assure high speed, quality production are: almost continuous wire travel, rapid cut-off, V-belt motor drive, ball and roller bearings, and extreme rigidity throughout. Write for details.

Mfd. by METTLER MACHINE TOOL, INC.

132R Lawrence St. **New Haven, Conn.**

Representatives in all principal cities and foreign countries.

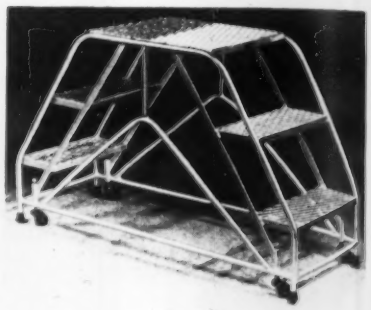
deep milling. A patented trip mechanism permits the operator to change from single to continuous running without the necessity of stopping the press.

Adjustable bed permits quick conversion from standard press to long punch, half or horn press. Connection rod bearings of steel encircled bronze-lead alloy, insuring long life and maximum efficiency of lubrication.

Check No. 13 on Reply Card for more Details

Falling Danger Cut

Steps on both ends of the A-type ladder made by Ballymore Co., 139 Pennsylvania Ave., Wayne, Pa., enable two or more people to use the ladder at one time on large assembly jobs and in stockroom aisles. Ladder unloaded rolls on swivel casters but the weight of a person causes the



spring mounted casters to deflect so that rubber tipped legs engage the floor and the ladder will not roll.

Frame of the A-type ladder is made of welded tubular steel. Steps are expanded steel providing a nonslip surface, welded to bar stock for rigidity. The ladder is 30 inches high, 17½ inches wide and 48 inches deep. The top step has a 20-inch tread, others have a 7-inch tread.

Check No. 14 on Reply Card for more Details

Spot Welding Control

Air cooled thyratron tubes make and break the welding current and there are no moving parts in synchronous control equipment for low capacity spot-type resistance welding machines made by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. All components are mounted on a side swing panel, enclosed in a NEMA type I enclosure, for easier inspection and maintenance.

Units can be mounted on or near the welding machine and knockouts are provided in the enclosure to facilitate making external electrical connections. Synchronous units can be supplied in rms current ratings up to

TEN *Outstanding Advantages of the* AJAX-SCOMET *High Power* INDUCTION FURNACES *for melting metals*

1. 1000 kW. or more per unit.
2. Uninterrupted around-the-clock production.
3. High efficiency and good operating conditions due to modern design.
4. Adaptable for copper, aluminum, zinc and their alloys.
5. Uniformity of alloy composition insured by large holding capacity.
6. Drastic reduction in labor cost per ton of metal processed.
7. Excellent scrap recovery with controlled metal circulation.
8. Large opening suitable for mechanized automatic charging.
9. Three-phase balanced stable load at line frequency.
10. Decreased lining cost with replaceable "twin coil" inductors.

The photograph shows one of a battery of three Ajax-Scomet furnaces installed at the Scovill Manufacturing Company in Waterbury, Connecticut. Nominal rating 1000 kW, operating up to 1200 kW.

This battery supplies all the metal required by one Junghans-Rossi continuous casting machine for producing 24" wide 2½" thick slabs for rolling. All commercial alloys are produced exclusively in these furnaces, which have been in continuous operation since early 1949.

Our ability to produce furnaces of the capacity shown here is ample evidence that we can fill most requirements, large or small.

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

New di-acro POWERSHEAR

OFFERS
CONTINUOUS ACTION
plus
VARIABLE SPEED

From 30 to 200 strokes per minute

for high speed
DIE-LESS DUPLICATING

The new Di-Acro POWERSHEAR has remarkable speed and accuracy for the production of small parts and pieces. Consider these points:

1. CONTINUOUS SHEARING ACTION—no clutch to engage! Feeding speed determines shearing speed. 2. VARIABLE SPEED—cutting cycle quickly set for each shearing operation. 3. EASE OF OPERATION—fatigue is reduced, accuracy increases, production soars. 4. "SINGLE STROKE" SHEARING—non-repeating safety clutch for jobs not adaptable to continuous shearing.

Any plant doing high speed precision work on smaller parts from any shearable material cannot afford to be without the DI-ACRO POWERSHEAR. Available in 12" and 24" shearing widths, capacity 16 gauge sheet steel. Also standard model.

Send For 40-Page Catalog

giving full details on Di-Acro Powershears, also Di-Acro Benders, Brakes, Rod Parters, Notchers and Punches.

DI-ACRO PRECISION MACHINES — DIE-LESS DUPLICATING

MAIL COUPON TODAY

O'NEIL-IRWIN MFG. CO.

304 8TH AVE., LAKE CITY, MINN.

Please send 40-page catalog including "Die-Less Duplicating" Engineering Service Offer.

Name

Company

Address

City State

50 amperes at a 10 per cent duty cycle. Nonsynchronous units are available in ratings up to 100 amperes at 10 per cent duty cycle.

Check No. 15 on Reply Card for more Details

Another Payloader Made

Model HY Payloader tractor shovel has a 1¼ cubic yard bucket and is available with 60 hp gasoline or diesel power. It is the latest addition to the tractor shovel line made by Frank G. Hough Co., 876 Seventh St., Libertyville, Ill. Engine is at the rear over the drive wheels for maximum tractive effort and capacity. This model also offers hydraulic power control of bucket-dump and bucket-close.

A full-reversing transmission gives four speeds in each direction, up to 29 miles per hour. It has an independent, quick-acting reverse control. Steering is power boosted. Maximum dumping clearance is over 8 feet.

Check No. 16 on Reply Card for more Details

Electric Hoist Modified

Wright Hoist Division, American Chain & Cable Co. Inc., Bridgeport, Conn., announces line of Frame B Wright Speedway electric hoists. Available in capacities from 250 to 1000 pounds, these hoists are basically the same as the Frame 1 hoists but are made with shorter, deeper drum and are lighter, better balanced. They are ideal for hook suspension.

Highest capacity offered is 1000 pounds. Hoists use two parts of $\frac{3}{16}$-inch Trulay cable, a smaller load hook and a smaller trolley than the previous model. Hoists have shaved gears and lower limit switch is standard equipment.

Check No. 17 on Reply Card for more Details

Temperature Recorder

An electronic recorder for quick and accurate temperature measurement in rotors of large electric generators has been developed by Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Philadelphia, Pa. It is called the Elec-

Again Available— Limited Supply

STEEL EXPANSION FOR WAR

● Whether you produce steel, fabricate it or are an investor, the Korean war makes this book "must" reading.

Many consumers unable to obtain steel feel that our steelmaking capacity should be increased considerably. The steel industry, on the other hand, recalls vividly that 62 per cent of its capacity was idle during the five years beginning with 1930 and that 41 per cent was not used in the 5-year period ending with 1939.

During World War II, some 15,000,000 tons of steel ingot capacity were added most of which has been acquired by individual steel companies on an outright purchase or lease basis. Now the question has arisen as to whether our steelmaking capacity should be increased to an even greater extent. The experiences of World War II should be studied in coping with the various problems of the current emergency.

STEEL EXPANSION FOR WAR describes in detail the added capacity and cost of every steelmaking facility built during World War II. It contains a detailed list of companies making every type of finished steel product, plus data on new mills built during that period. Included is much information on new and revamped facilities of hundreds of plants, including those in ore, ore transportation, coal and coke, refractory, ferroalloy, scrap, foundry and forging industries.

STEEL EXPANSION FOR WAR is the authentic report on expansion of the steel industry for the 5½ years from January 1, 1940 to June 30, 1945. It was written by W. A. Hauck, chief of the Steel Control Branch of the War Production Board during World War II. You will find it invaluable in studying the future steel situation and in making your own plans in view of the Korean situation.

Illustrated with 148 photographs, numerous charts and tables, this helpful book is just $2.00 postpaid. Order your copy today before our limited supply is exhausted.

PENTON PUBLISHING COMPANY, Book Dept.,
Penton Building, Cleveland 13, Ohio
Please send me a copy of "Steel Expansion for War".
☐ Bill me (or my company) for $2.
☐ Remittance enclosed* in which case the book will be sent postpaid.
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Company .....
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City ..... Zone ..... State .....
*Please add 3% to cover state sales tax on orders for delivery in Ohio

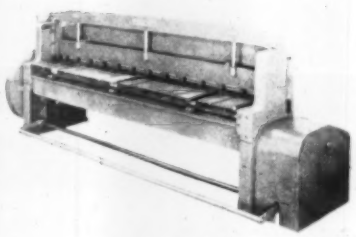
tronic and is designed to provide a better instrument to assist the operator in avoiding overloads. In addition it furnishes a 12-inch strip chart record which can be used as a guide for gradually cooling a generator.

Recorder has a range of 0 to 150° C, a limit error of 1.5° C, a dead zone of 0.3° C, and a pen speed of 1.4 minutes full scale. Range of rotor winding resistance is 0.1 to 4.0 ohms and it has a dielectric test of 1500 volt rms for one minute.

Check No. 18 on Reply Card for more Details

Power Shears Added

Squaring shears rated at 12 gage for mild steel and 16 gage stainless are being built by Wysong & Miles Co., Greensboro, N. C. Cutting lengths available are 52 inches, 6, 8 and 10 feet. Company tests each



shear on 10 gage sheets, cutting at full length at 60 strokes per minute to insure top performance at the 12 gage rating.

Standard equipment includes motor with controls and electrical equipment, ball-bearing, precision backgage adjustable to 1/128th-inch two front gage brackets and front gage, side and bevel gages, stainless steel scale embedded in table to aid in positioning sheets, slatted metal finger guard, nonrepeat unit and 4-edge blades.

Check No. 19 on Reply Card for more Details

Compact Hydraulic System

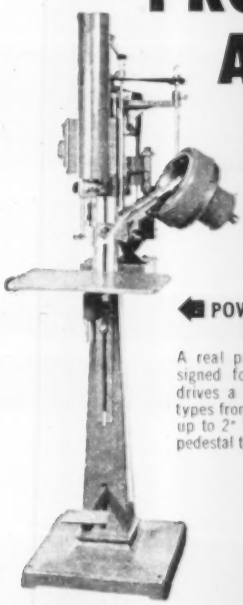
Packaged hydraulic system designed by Harco Industries, 20 Curtice St., Rochester 5, N. Y., is compact and adaptable for use in building simple hydraulic presses, jigs, clamps or fixtures. Solid coupling of motor and pump eliminates drive belts and the new design also minimizes pressure flutter and overheating due to maintenance of pilot pressures with large volume installations.

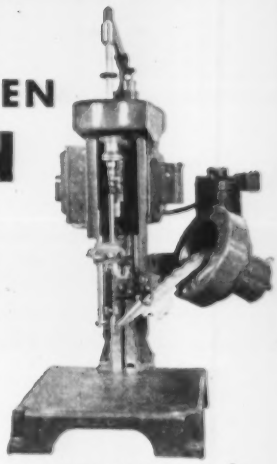
More than 100 models offer ranges of 1.8 to 8.25 gallons per minute, pressures up to 1000 psi. Totally enclosed motors range from ⅓ to 5 hp with manual, electropneumatic or hydraulic valve control. Complete unit.

INDUSTRIAL SPEED-UP

demands these POWER-DRIVEN PRODUCTION AIDS . . .

Now, more than ever, speed in production is the order of the day . . . That's why these popular D.P.S. power-driven machines prove a greater-than-ever contribution to present-day industrial needs.





POWER SCREWDRIVER (Model B)

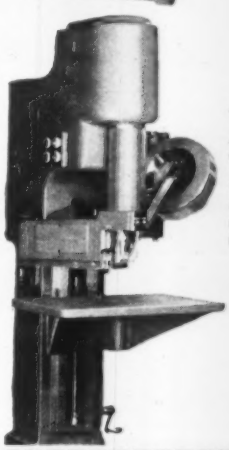
A real production machine designed for constant service. It drives a range of screws of all types from No. 6 to ¼" diameter, up to 2" length. Both bench and pedestal types.

POWER SCREWDRIVER (Model A)

A sensitive but sturdy machine for driving small screws in delicate assemblies. Capacity, No. 2 to No. 6 screws. Both bench and pedestal types. Designed for maximum service, easy operation and speed. All screws driven to uniform tension. Will not strip threads or mar heads.

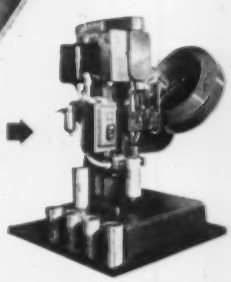
THE HOPPER UNIT

Motorized—Highly Adaptable—A selective feeding device whereby production parts are selected, oriented and fed in a given position for primary and secondary operations.



NUT DRIVER

A revolutionary new machine that drives nuts with amazing speed, either semi-automatically, or it can be adapted to full automatic operation entirely eliminating the manual handling of nuts. Capacity: nuts, 3/16" min. to 11/16" max. across flats.



SPECIAL ASSEMBLING MACHINES

For light assembly operations using Hopper Units to feed component parts.

MAIL COUPON FOR CATALOG

DETROIT POWER SCREWDRIVER CO.
2811 WEST FORT ST., DETROIT 16, MICHIGAN

Send your catalog and further details.

COMPANY NAME _____

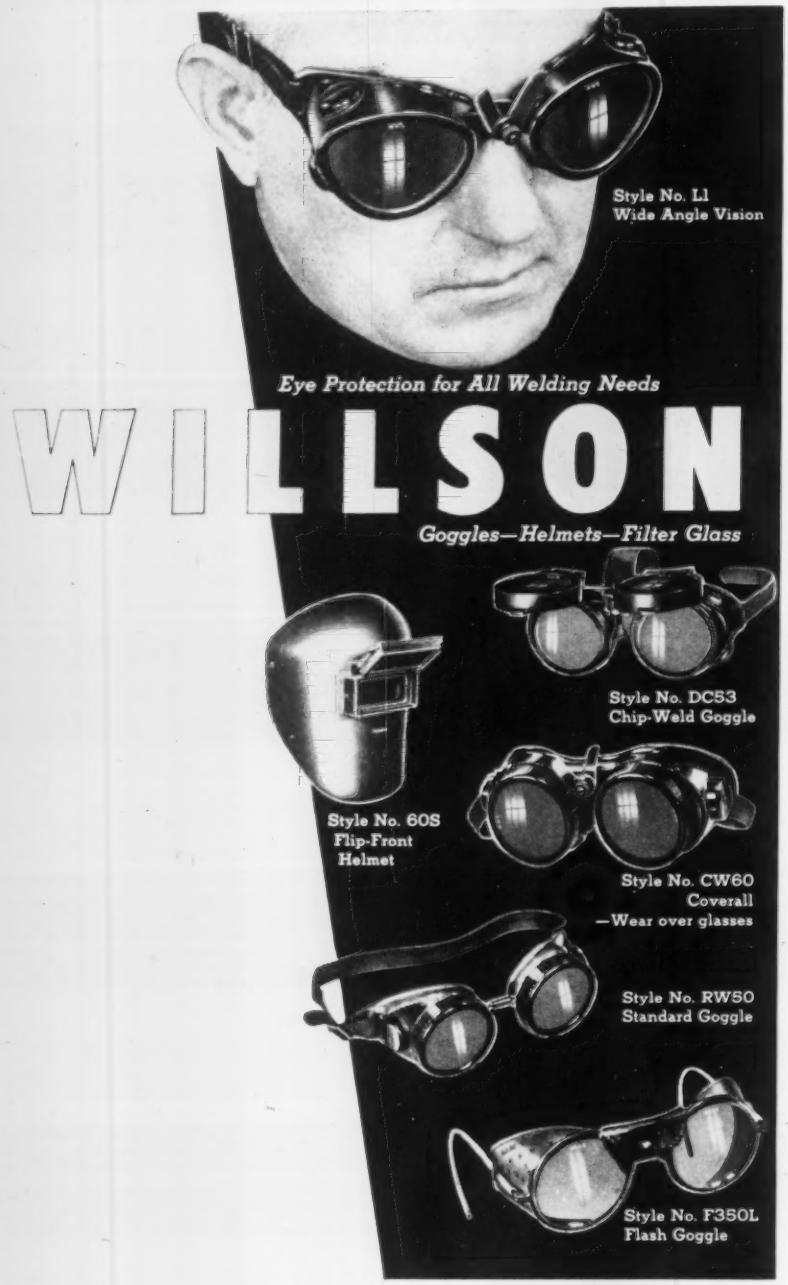
BY _____

STREET ADDRESS _____

CITY _____ STATE _____

SEND SAMPLE ASSEMBLY for PRODUCTION ESTIMATE

DETROIT POWER SCREWDRIVER CO.



You can depend on WILLSON for protection against welding eye hazards because of the 100% tested quality of WILLSON-Weld filter glass.

Before the WW trade mark of WILLSON quality is etched on a filter lens, it has been tested for filtering out dangerous rays, graded for shade, inspected for correct thickness and diameter, optical quality, and visible flaws and scratches. The lens meets Federal Specifications backed by the WILLSON reputation for quality and integrity.

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*T.M. Reg. U.S. Pat. Off.

See our new catalog for complete information. Get it from your WILLSON distributor or write direct to WILLSON PRODUCTS, INC., 233 Washington Street, Reading, Pa.

which may be used as complete hydraulic system or as a pilot system on a large installation includes motor, solid coupling, vane-type pump, reservoir, oil cooler, air filter, overload valve, pressure regulating valve and 3 or 4-way valve or combination of both.

Check No. 20 on Reply Card for more Details

Broad Testing Range

Simplified, accurate tension, compression, transverse and flexure testing can be performed on the super L line of hydraulic testing machines made by Tinius Olsen Testing Machine Co., 1096 Easton Rd., Willow Grove, Pa. Selectorange indicating system makes possible a 50 to 1 spread of testing ranges on one 28-inch dial. Indicating system is entirely separate from the loading system in that the load is developed hydraulically and is measured and indicated electronically. Full 1/5 and 1/50 capacities are indicated in three different colors on the same dial of the indicator with zeros for all ranges being identical. Since zero loads of all ranges are identical, test ranges may be changed during a test without changing the rate of loading.

Machines are provided with hydraulic safety valves and stroke limit switch to prevent overloading and overtravel; crossheads are supplied with either hand crank or motor drive. By using an Olsen electronic recorder in conjunction with these machines testing ranges may be increased to a ratio of 100 to 1. Machines are available in 60,000, 120,000, 200,000 and 300,000-pound capacities. Suitable middle ranges and low ranges are 1200, 3000, 4000 and 6000 pounds respectively.

Check No. 21 on Reply Card for more Details

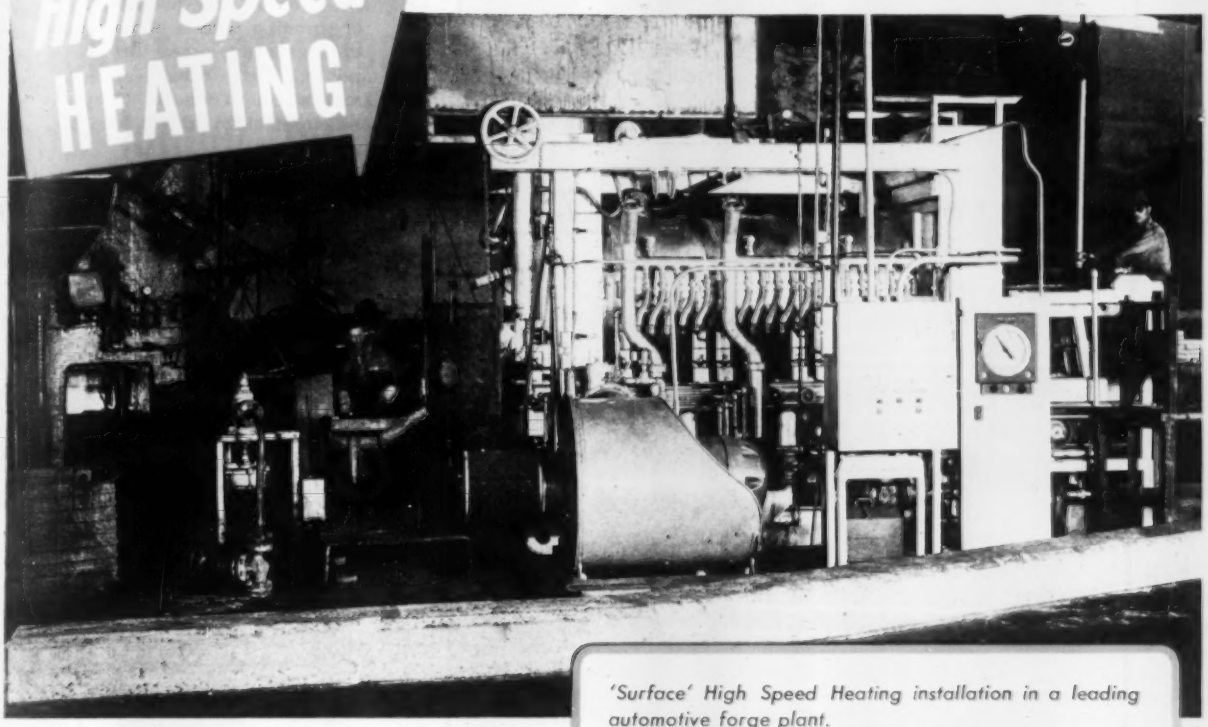
• • •

PROTECTS METAL: Gulf Oil Corp., Pittsburgh 30, Pa., announces No-Rust No. 6 for protection of metal surfaces against corrosion in either indoor or outdoor exposure during shipment and indoor or outdoor storage for long periods of time. It is a rust preventive of the thin film type and has no tendency to settle or separate in storage. It can be applied by brushing, spraying or dipping and is removed with stoddard solvent, kerosene or similar petroleum solvents.

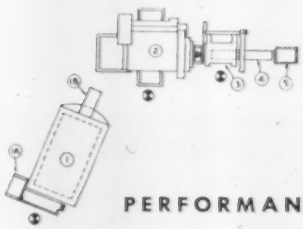
Check No. 22 on Reply Card for more Details

HEAT-RESISTANT ENAMEL: Base Y 2323, a new baking enamel for finishing metals, developed by United Lacquer Mfg. Corp., Linden, N. J.,

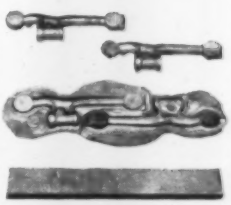
'Surface' High Speed HEATING *for* Production Forging



'Surface' High Speed Heating installation in a leading automotive forge plant.



PERFORMANCE DATA



PART: Steering knuckle support.
RATED CAPACITY OF FURNACE:
300 Billets (17 lbs. ea.)
SIZE 19" x 2¼" x 1¼"
REMARKS—
Die life increased 16%
Scrap loss less than 2%
Maintenance less than $.30/ton
FURNACE: Automatic pusher type equipped with dampers for atmosphere control.

'Surface' High Speed Heating Furnaces have been making performance records wherever they have been installed in leading production forging plants. Increased production . . . better quality of product and work . . . improved working conditions, all without added floor space, combine to make these furnaces the choice over other heating methods.

Now, you can create New Profits in Production Forging by converting to 'Surface' High Speed Heating. More descriptive data on the high speed combustion system, the furnace unit, application and comparative costs are available in 'Surface' Bulletin SC-144. Write for your copy—today!

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

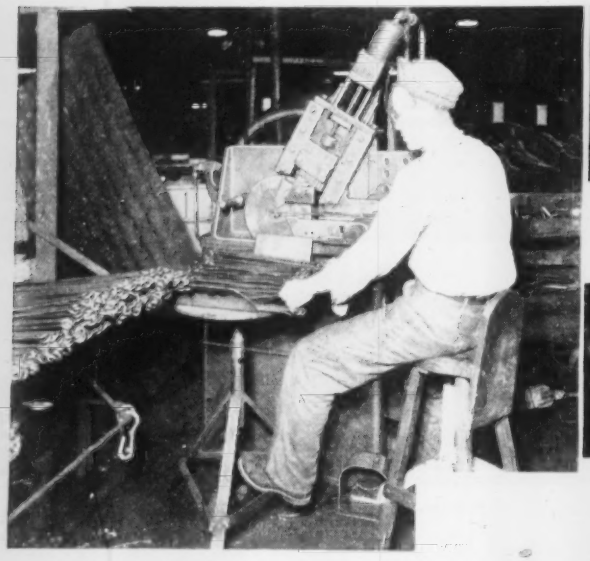
FOREIGN AFFILIATES: *Stein & Roubaix, Paris* — *British Furnaces, Ltd., Chesterfield*

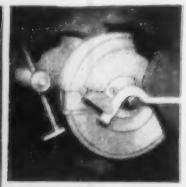
'Surface' INDUSTRIAL FURNACES

FOR: Gas Carburizing and Carbon Restoration (Skin Recovery), Homogeneous Carburization, Clean and Bright Atmosphere Hardening, Bright Gas-Normalizing and Annealing, Dry (Gas) Cyaniding, Bright Super-Fast Gas Quenching, Atmosphere Malleableizing and Atmosphere Forging. Gas Atmosphere Generators.

Hydraulic Eye-Bender . . .

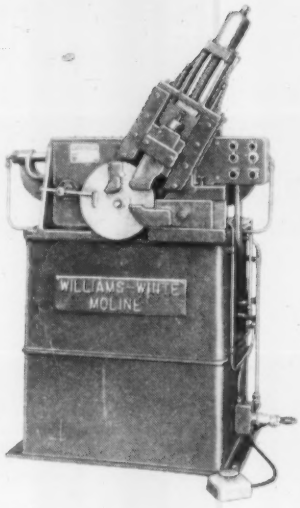
for production shaping of small stock and forming round or oval eyes, hooks, etc.





Above
Starting bend

Below
Finished eye



- Completely new, self-contained, hydraulically operated bender
- Welded steel construction
- Hydraulic pump with direct drive, 5HP electric motor
- Footbutton control; "inching" button provided for setting dies.
- Capacity: 1" diam. stock (hot) around a 1½" mandrel
- Strokes per minute, 20

The machine described above is typical of the up-to-date, efficient machines by WILLIAMS-WHITE & CO.

Write for free information regarding this and other WILLIAMS-WHITE machines, including presses, bulldozers, punches, shears, rolls and hammers for every type of heavy production.

MAKERS OF QUALITY PRODUCTION TOOLS FOR NEARLY 100 YEARS

WILLIAMS-WHITE & Co.
702 THIRD AVE., MOLINE, ILLINOIS

adheres well to steel, aluminum, brass, chrome plate, gold and silver. It offers a high degree of heat resistance, is nonyellowing and gives good chemical, solvent and mar resistance.

Check No. 23 on Reply Card for more Details

BUSHINGS FOR GRINDING WHEELS: Norton Co., Worcester, Mass., offers new precision bushings for grinding wheels. These patented bushings are pressed into the wheel and maintain consistent hole size from wheel to wheel. They can be used in straight wheels 5 to 8 inches in diameter.

Check No. 24 on Reply Card for more Details

SCREW FEED ATTACHMENT: For use with the Delta 14-inch metal cutting band saw, the Power Tool Division, Rockwell Mfg. Co., Milwaukee 1, Wis., provides a screw feed attachment. It has a fingertip feed screw release for quick adjustment, a star wheel to provide efficient feed action with little effort, an adjustable jaw usable in many positions for handling irregular shaped work and a laterally adjustable pivot block.

Check No. 25 on Reply Card for more Details

WELDING ELECTRODE: A new welding electrode, DH-4, is announced by Harnischfeger Corp., Milwaukee 14, Wis. In making a weld it leaves a negligible deposit of the weld metal so that the fusion consists mainly of the parent metal. This gives the weld a stronger character. The electrode is available in three sizes, $\frac{1}{8}$-inch for use at 300 amp, $\frac{5}{32}$-inch at 400 amp and $\frac{3}{16}$-inch at 450 to 500 amp.

Check No. 26 on Reply Card for more Details

SELF-POSITIONING GAGE: Nilco dial groove gage, developed by Nilsson Gage Co., Poughkeepsie, N. Y., is a self-positioning instrument designed to provide positive control in checking diameters of internal grooves and recesses, Truarc and O rings, oil grooves, etc. Range settings are made with a simple knurled vernier nut adjustment.

Check No. 27 on Reply Card for more Details

FREQUENCY TIME COUNTER: Designated as model 801, a megacycle frequency time counter, introduced by Potter Instrument Co., Great Neck, N. Y., can be used for frequency measurements, time interval measurements and frequency ratios. It can also be used as a secondary frequency standard, a 1 megacycle totalizing electronic counter and a direct reading revolutions per min-

Up to 35% greater production, much longer tool life

with GULF "LASUPAR" and "ELECTRO" CUTTING OILS

These new improved Gulf sulphurized cutting oils contain sulphur combined by a special Gulf Process so that it is extremely active over the entire range of a cutting operation. That's the important reason why users are able to step up feeds and speeds on tough machining jobs. They report production increases of as much as 35% after switching from conventional oils of this type.

Gulf Lasupar and Electro Cutting Oils provide excellent protection for the tool at elevated production rates—help reduce built-up edge, prevent chip welding, prolong tool life.

Because Gulf Electro Cutting Oil contains a larger percentage of this extremely active sulphur ingredient, it is recommended for the toughest machining jobs, where production and tool life are a problem.

Gulf Lasupar Cutting Oil also contains stable sulphurized fatty oil, effective in producing the fine finishes for which this quality cutting oil is so well known.

Operators everywhere welcome the new Gulf Lasupar and Electro Cutting Oils—because they get all these production advantages without the disagreeable odor ordinarily associated with sulphurized cutting oils.

Call in a Gulf Lubrication Engineer today and arrange to use these outstanding oils in your shop. Or send the coupon below for additional information.

FIFTY YEARS OF SERVICE
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PETROLEUM AND ITS PRODUCTS

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3-SZ Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of each of your new pamphlets "Gulf Lasupar Cutting Oil," "Gulf Electro Cutting Oil."

Name

Company

Title

Address

ute tachometer. It incorporates two complete electronic counting chains, a 100,000 cycle per second crystal oscillator frequency standard and electronic switching and gating circuits.

Check No. 28 on Reply Card for more Details

MEASURES TEMPERATURE: Leeds & Northrup Co., Philadelphia 44, Pa., offers a new roll surface temperature unit to measure temperature of a moving roll surface without touching the roll. Applicable to roll diameters down to 9 inches and to flat surfaces, it operates independent of surface speed, emission characteristics and finish. Device can be mounted at center of the roll or wherever actual temperature measurement is desired.

Check No. 29 on Reply Card for more Details

FINISHING TOOLS: Severance Tool Co., Saginaw, Mich., announces a set of eight ¼-inch shank carbide rotary finishing tools. Tooth patterns are of a type which make possible rapid stock removal and minimize annoyance from slivers. Designated as Di-Car set No. 40, they finish either hardened or unhardened dies smoothly.

Check No. 30 on Reply Card for more Details

HOLDS BLADES: Cutter vise, announced by Ingersoll Milling Machine Co., Rockford, Ill., holds inserted blade milling cutters firmly in a convenient position while blades are being reset. Power operated jaws of the vise are opened and closed by an air pressure valve as the operator indexes the cutter. Arbors for cutters with 1½ and 2½-inch diameter bores are standard equipment, others are available as special equipment.

Check No. 31 on Reply Card for more Details

MINIMIZES WARPING: An annealing spider, introduced by KIF Industrial Fabricators, North Haven, Conn., is designed to minimize warping, give longer life and reduce loading and stripping friction in wire annealing. With an overall height of 81 inches, any diameter can be furnished within a range of 10 to 30 inches. It is available with either solid or removable bottom plates to suit any stripping method.

Check No. 32 on Reply Card for more Details

AIR FILTER: Designed to operate at velocities up to 500 fpm and maintain a uniformly high cleaning efficiency over a wide range of air velocities are the new type HV filters made by American Air Filter Co. Inc., Louisville 8, Ky. They can be serviced with washing and charging tanks or reconditioned by washing out accumulated dust with hose and spraying with filter adhesive.

Check No. 33 on Reply Card for more Details

REVOLUTION COUNTER: High speed revolution counter with flexible shaft drive for convenient counter positioning is available from Production Instrument Co., Chicago 6, Ill. It operates at speeds to 4000 cycles per minute and has extra large shaft with over sized bearings.

Check No. 34 on Reply Card for more Details

FOR FERROUS SURFACE: Multi-Use primer, developed by James B. Sipe & Co., Pittsburgh, Pa., is a rust inhibiting primer that can be used for spraying or dipping applications on clean ferrous or aluminum surfaces. It will bake or air dry and can be cured simultaneously with its top coat in one bake operation.

Check No. 35 on Reply Card for more Details

CADMIUM, ZINC BRIGHTENERS: R. O. Hull & Co. Inc., Rocky River 16, O., offers a new cadmium brightener and two zinc brighteners. Rohco 20XL cadmium brightener is available as a liquid or powder additive and Rohco 100 barrel and 303 still zinc brighteners are available as liquid additives. All brighteners give brilliance, uniformity of thickness and covering power.

Check No. 36 on Reply Card for more Details

BORING HEADS: Five new offset boring heads are available from Flynn Mfg. Co., Ferndale, Mich. Identified as 40 series, they will carry model numbers 43, 45, 47, 48 and 49. Bar offset of the new series ranges from ⅝-inch to 1½ inches. Boring tool may be inserted in the head either vertically or horizontally.

Check No. 37 on Reply Card for more Details

INDICATES WATER PURITY: Bantam demineralizer, made by Barnstead Still & Sterilizer Co., Boston 31, Mass., is equipped with a direct reading meter which indicates water purity. It has a needle type regulating valve for easy flow adjustment, a drain valve and a sturdy base for bench mounting.

Check No. 38 on Reply Card for more Details

QUILL MOUNTING: Pratt & Whitney, West Hartford 1, Conn., has developed a spindle quill for No. 2A and No. 3B jig borers. It is hardened, ground and draw polished by hand to extreme accuracy and a fine microinch finish and roll feeds on 240 specially selected precision balls, all preloaded, giving a total bearing pressure of 6000 pounds between quill and hardened liners.

Check No. 39 on Reply Card for more Details

LESS NOISE: Seminoiseless electric vibrators, offered by Syntron Co., Homer City, Pa., are useful on interior bins, hoppers and chutes where large numbers of employees are working. All metallic striking parts have been eliminated; springs pound against rubber bumpers. Vibrators are available in four models.

Check No. 40 on Reply Card for more Details

INSULATING BUSHING: O. Z. Electric Mfg. Co., Brooklyn, N. Y. offers a new male thread insulating bushing that features ribbed outer surface to facilitate installation by providing a sure-grip. It also has clean deep threads for easier spin-on and smooth rounded edges for protecting wire insulation during pulling and when in service.

Check No. 41 on Reply Card for more Details

SCREW DRIVER BITS: A new line of screw driver bits for hand brace use is announced by Midway Tool Co. Inc., Melvin, O. Bits are available in ¼, ⅜, ⅜ and ½-inch sizes.

Check No. 42 on Reply Card for more Details

STAMPS CHANNEL SECTIONS: CM-50 channel marking machine, developed by M. E. Cunningham Co., Pittsburgh 19, Pa., stamps trade name, address or other identification on aluminum or other metal channel sections. It is operated by pulling the handle from left to right. A spring returns the mandrel to position for next marking.

Check No. 43 on Reply Card for more Details

DETECTS FIRE: Fire protection system FD-10, developed by Fireye Corp., Cambridge 42, Mass., detects fire instantaneously because it sees fire and does not depend on heat, smoke or other indications. It provides complete coverage throughout a room or fire zone and does not have to be located where it will be directly exposed to fire.

Check No. 44 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

The Market Outlook

PRESSURE of defense demand on the steel mills mounts steadily. Further sharp inroads on supplies for the civilian goods market loom immediately ahead. Decided upswing in the volume of emergency specifications soon may lead to new government demands on producers for additional capacity to expedite the handling of defense requirements. Mills now are scheduled into June, in some cases beyond, on DO-rated priorty orders.

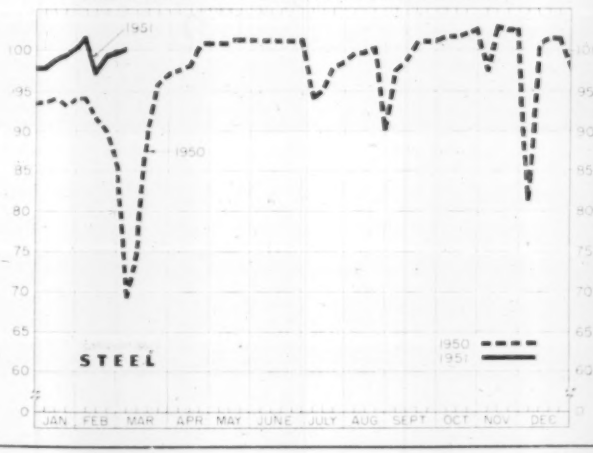
SET-ASIDES— Despite the fact rolling schedules on DO tonnage now are well extended and most of the mills hold rated orders considerably beyond their required minimum quotas under National Production Authority regulations, there is growing need for faster deliveries as defense manufacturing programs pick up speed and expand. Less than three weeks ago set-aside tonnage for DO account was upped on carbon and alloy products. But it is apparent still more tonnage will be needed if defense schedules are to be met. Hence, another boost in mill set-asides looms as a possibility for the near future, definite decision likely being made before May lead-time for order scheduling.

PRODUCTION— Steelworks operations edged closer the 2-million-ton mark last week, the national ingot rate rising ½ point to 100 per cent of capacity. Mill schedules called for output of more than 1,995,000 net tons. The industry, however, has not yet fully recovered from effects of the recent switchmen's strike. Shipments of finished steel are hampered at some points because of the log-jam arising from the rail strike, and also a serious shortage of freight cars. In Cleveland operations at plants of American Steel & Wire Co. are curtailed due to short billet supply arising from the recent strike-forced shutdown of its supplying plant. In the Chicago area, the Gary sheet and tin mill of United States Steel Co. is wrestling with a severe car shortage.

RAW MATERIALS — Supply troubles are mounting with respect to raw materials. Pig iron and coke for the foundries are increasingly scarce and prospects are dim for early relief. In fact, the situation promises to get worse as time passes and production facilities necessarily are taken off for needed repairs. Serious shortages of scrap, both steelmaking and foundry grades, threaten. As a result talk is heard in the market of possible early resort to mandatory allocation of scrap as the stringency becomes more acute. Similarly, talk of possible pig iron allocations is heard though no move has been taken in that direction as yet. Most market observers think such action, if taken at all, will be deferred until the government is ready to put the Controlled Materials Plan into operation, probably in July.

PRICES— Iron and steel prices are holding firmly at levels in effect in January under the government's freeze order. STEEL's weighted composite on finished steel holds at 171.92 and compares with 156.13 a year ago. The arithmetical price composite on finished steel also is steady at $106.02 against $93.18 last year. Pig iron composites are: No. 2 foundry, $52.54, basic, $52.16, and malleable, $53.27. The steelmaking scrap composite at $44 compares with $27.33 a year ago. Currently, activity in scrap is restrained, dealers not forcing material onto the market. Meanwhile, an acute stringency in supply appears in the making with some mills reported operating on hand-to-mouth inventories. Some further changes in the scrap price order are being advocated to correct inequities in present regulations, and to eliminate abuses, such as upgrading, reported on the increase.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Mar. 3	Change	Same Week 1950	Same Week 1949
Pittsburgh	99	— 1.5*	52.0	98
Chicago	102.5	+ 0.5	86.5	100.5
Eastern Pa.	99.5	0	61	97
Youngstown	101	— 1	59	105
Wheeling	96	+ 1	89	92
Cleveland	101	+ 3.5*	93.5	99.5
Buffalo	104	0	93.5	104
Birmingham	100	0	55	100
New England	90	0	80	87
Cincinnati	106	+ 8	89	106
St. Louis	87	0	84.5	82.5
Detroit	108	— 1*	98	103
Western	101.5	— 2.5	81	—
Estimated national rate	100	+ 0.5	69	99.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

Composite Market Averages

	Mar. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av. 100)	171.92	171.92	171.92	156.13	106.82
Index in cents per lb.	4.657	4.657	4.657	4.230	2.894
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$93.18	$63.54
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	46.47	25.42
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	24.75
Malleable Pig Iron, GT	53.27	53.27	53.27	47.27	26.04
Steelmaking Scrap, GT	44.00	44.00	48.00	27.33	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 3-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Mar. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bar, H.R., del. Philadelphia	4.18	4.18	4.18	3.93	2.82
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10–15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.90	3.90	3.90	3.46	2.465
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60–75	3.60–75	3.60–75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75–4.00	3.75–4.00	3.75–4.00	3.25	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65–5.35	4.65–5.35	4.65–5.35	4.15	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35–5.60	4.35–5.60	4.35–5.60	4.35–40	3.15
Wire, Basic, Pittsburgh	4.85–5.10	4.85–5.10	4.85–5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90–6.20	5.90–6.20	5.90–6.20	5.30	3.25
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ⅜-⅝", Pitts.	4.10–30	4.10–30	4.10–30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.00	$26.25
Basic, Valley	52.00	52.00	52.00	46.00*	25.25
Basic, del. Phila.	56.39	56.39	56.39	49.44	27.09
No. 2 Fdry, Pitts.	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Valley	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Del. Phila.	56.89	56.89	56.89	49.94	27.59
No. 2 Fdry. Birm.	48.88	48.88	48.88	42.38	22.13
No. 2 Fdry (Birm.) del. Cin.	55.58	55.58	55.58	49.08	25.81
Malleable, Valley	52.50	52.50	52.50	46.50	25.75
Malleable, Chicago	52.50	52.50	52.50	46.50	25.75
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$51.50	$31.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	47.50	23.50	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	45.00	27.50	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	51.25	31.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	50.75	28.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	51.50	28.25	19.25
Rails, Rerolling, Chicago	52.50	52.50	67.00	40.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	62.00	41.00	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$13.25	$7.50
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	15.50	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	21.00	13.00

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	18.50	12.00
Zinc, E. St. Louis	17.50	17.50	17.50	9.75	8.25
Lead, St. Louis	16.80	16.80	16.80	11.80	6.35
Tin, New York	182.00	183.00	182.50	74.125	52.00
Aluminum, del.	19.00	19.00	19.00	17.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	50.50	50.50	50.50	40.00	35.00

Pig Iron

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on following two pages.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y.,del.	....	58.79	59.29	....
Newark,del.	56.63	57.13	57.63	58.13
Philadelphia,del.	56.39	56.89	57.39	57.89
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati,del.	....	55.58	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston,del.	61.26	61.76	62.20	....
Rochester,N.Y.,del.	54.63	55.13	55.63	....
Syracuse,N.Y.,del.	55.58	56.08	56.58	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee,del.	53.89	54.39	54.39	54.89
Muskegon,Mich.,del.	....	57.98	57.98	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.39	54.89	54.89	54.39
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	53.25	53.75	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash.,del.	....	60.20	....	....
Portland,Oreg.,del.	....	60.20	....	....
LosAngeles,SanFrancisco,del.	59.70	60.20	....	....
GraniteCity,Ill. K7	53.90	54.40	54.90	....
St.Louis,del. (inc. tax)	54.65	55.15	55.65	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts.,N.&S. sides, Ambridge, Aliquippa,del.	....	53.69	53.69	54.19
McKeesRocks,del.	....	53.45	53.45	53.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	....	53.94	53.94	54.44
Verona,del.	....	54.40	54.40	54.90
Brackenridge,del.	....	54.63	54.63	55.13
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati,del.	57.01	57.51	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O.,del.	56.26	56.76	56.76	57.26

* Low phos. southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75–2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.00

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$83.00
Keokuk,Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si. frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.00
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Base prices quoted under GCPR as reported to STEEL, Mar. 1, 1951; cents per pound except as otherwise noted. Changes shown in italics. *Code numbers following mill points indicate producing company; key on next two pages.*

INGOTS, Carbon, Forging (NT)

Forging, Calif. K1 ... $79.00
Midland, Pa. U5 ... 52.00

INGOTS, Alloy (NT)

Detroit ... $54.00
Forging, Calif. K1 ... 80.00
Houston, Tex. S5 ... 62.00
Midland, Pa. C18 ... 54.00
Midland, Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer, Pa. U5 ... $56.00
Clairton, Pa. U5 ... 56.00
Ensley, Ala. T2 ... 56.00
Fairfield, Ala. T2 ... 56.00
Forging, Calif. K1 ... 75.00
Gary, Ind. U5 ... 56.00
Johnstown, Pa. B2 ... 56.00
Lackawanna, N.Y. B2 ... 56.00
Midland, Pa. U5 ... 56.00
So. Chicago, Ill. U5 ... 56.00
So. Duquesne, Pa. U5 ... 56.00

Carbon, Forging (NT)

Bessemer, Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton, O. R2 ... 66.00
Clairton, Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken, Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley, Ala. T2 ... 66.00
Fairfield, Ala. T2 ... 66.00
Fontana, Calif. K1 ... 85.00
Gary, Ind. U5 ... 66.00
Geneva, Utah G1 ... 66.00
Houston, Tex. S5 ... 74.00
Johnstown, Pa. B2 ... 66.00
Lackawanna, N.Y. B2 ... 66.00
Los Angeles B3 ... 85.00
Munhall, Pa. U5 ... 66.00
Seattle B3 ... 85.00
So. Chicago R2, U5, W14 ... 66.00
So. Duquesne, Pa. U5 ... 66.00
So. San Francisco B3 ... 85.00

Alloy, Forging (NT)

Bethlehem, Pa. B2 ... $70.00
Buffalo R2 ... 70.00
Canton, O. R2 ... 70.00
Canton, O. (2) T7 ... 66.00
Conshohocken, Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana, Calif. K1 ... 89.00
Gary, Ind. U5 ... 70.00
Houston, Tex. S5 ... 78.00
Ind. Harbor, Ind. Y1 ... 70.00
Johnstown, Pa. B2 ... 70.00
Lackawanna, N.Y. B2 ... 70.00
Los Angeles B3 ... 90.00
Massillon, O. R2 ... 70.00
Midland, Pa. C18 ... 70.00
Munhall, Pa. U5 ... 70.00
So. Chicago R2, U5, W14 ... 70.00
So. Duquesne, Pa. U5 ... 70.00
Struthers, O. Y1 ... 70.00
Warren, O. C17 ... 70.00

ROUNDS, SEAMLESS TUBE (NT)

Canton, O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana, Calif. K1 ... 103.00
Gary, Ind. U5 ... 82.00
Massillon, O. R2 ... 82.00
So. Chicago, Ill. R2 ... 82.00
So. Duquesne, Pa. U5 ... 82.00

SHEET BARS (NT)

Fontana, Calif. K1 ... $89.00

SKELP

Aliquippa, Pa. J5 ... 3.45
Munhall, Pa. U5 ... 3.35
Warren, O. R2 ... 3.35
Youngstown R2, U5 ... 3.35

WIRE RODS

Alabama City, Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora, Pa. A7 ... 4.10
Fairfield, Ala. T2 ... 4.10
Fontana, Calif. K1 ... 4.90
Houston, Tex. S5 ... 4.50
Johnstown, Pa. B2 ... 4.10
Joliet, Ill. A7 ... 4.10
Los Angeles B3 ... 4.90
Minnequa, Colo. C10 ... 4.35
Monessen, Pa. P7 ... 4.30
No. Tonawanda, N.Y. B11 ... 4.10
Pittsburg, Calif. C11 ... 4.75
Portsmouth, O. P12 ... 4.30
Roebling, N.J. R5 ... 4.20
So. Chicago, Ill. R2 ... 4.10
Sparrows Point, Md. B2 ... 4.20
Sterling, Ill. (1) N15 ... 4.10
Struthers, O. Y1 ... 4.10
Torrance, Calif. C11 ... 4.90
Worcester A7 ... 4.40

PLATES, Wrought Iron

Economy, Pa. B14 ... 8.60

STRUCTURALS
Carbon Steel Stand. Shapes

Alabama City, Ala. R2 ... 3.60
Aliquippa, Pa. J5 ... 3.65
Bessemer, Ala. T2 ... 3.65
Bethlehem, Pa. B2 ... 3.70
Clairton, Pa. U5 ... 3.60
Fairfield, Ala. T2 ... 3.65
Fontana, Calif. K1 ... 4.25
Gary, Ind. U5 ... 3.65
Geneva, Utah G1 ... 3.60
Houston, Tex. S5 ... 4.05
Ind. Harbor, Ind. I-2 ... 3.65
Johnstown, Pa. B2 ... 3.70
Kansas City, Mo. S5 ... 4.25
Lackawanna, N.Y. B2 ... 3.70
Los Angeles B3 ... 4.20
Minnequa, Colo. C10 ... 4.10
Munhall, Pa. U5 ... 3.65
Niles, Calif. (22) P1 ... 4.85
Phoenixville, Pa. P4 ... 4.95
Portland, Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So. Chicago, Ill. U5, W14 ... 3.60
So. San Francisco B3 ... 4.20
Torrance, Calif. C11 ... 4.25
Weirton, W.Va. W6 ... 3.90

Alloy Stand. Shapes

Clairton, Pa. U5 ... 4.35
Fontana, Calif. K1 ... 5.55
Munhall, Pa. U5 ... 4.35
So. Chicago, Ill. U5 ... 4.35

H.S., L.A. Stand. Shapes

Aliquippa, Pa. J5 ... 5.50
Bessemer, Ala. T2 ... 5.50
Bethlehem, Pa. (14) B2 ... 5.50
Clairton, Pa. U5 ... 5.50
Fairfield, Ala. T2 ... 5.50
Fontana, Calif. K1 ... 6.10
Gary, Ind. U5 ... 5.50
Geneva, Utah G1 ... 5.50
Ind. Harbor, Ind. I-2 ... 5.50
Ind. Harbor, Ind. Y1 ... 6.00
Johnstown, Pa. B2 ... 5.50
Lackawanna, N.Y. (14) B2 ... 5.50
Los Angeles B3 ... 6.05
Munhall, Pa. U5 ... 5.50
Seattle B3 ... 6.10
So. Chicago, Ill. U5 ... 5.50
So. San Francisco B3 ... 6.00
Struthers, O. Y1 ... 6.00

Wide Flange

Bethlehem, Pa. B2 ... 3.70
Clairton, Pa. U5 ... 3.65
Fontana, Calif. K1 ... 4.65
Lackawanna, N.Y. B2 ... 3.70
Munhall, Pa. U5 ... 3.65
So. Chicago, Ill. U5 ... 3.65

H.S., L.A. Wide Flange

Bethlehem, Pa. B2 ... 5.50
Lackawanna, N.Y. B2 ... 5.50
Munhall, Pa. U5 ... 5.45
So. Chicago, Ill. U5 ... 5.45

SHEET STEEL PILING

Ind. Harbor, Ind. I-2 ... 4.45
Lackawanna, N.Y. B2 ... 4.45
Munhall, Pa. U5 ... 4.45
So. Chicago, Ill. U5 ... 4.45

BEARING PILES

Munhall, Pa. U5 ... 3.65
So. Chicago, Ill. U5 ... 3.65

PLATES, High-Strength Low-Alloy

Aliquippa, Pa. J5 ... 5.65
Bessemer, Ala. T2 ... 5.65
Clairton, Pa. U5 ... 5.65
Cleveland J5, R2 ... 5.65
Conshohocken, Pa. A3 ... 5.90
Fairfield, Ala. T2 ... 5.65
Fontana, Calif. (30) K1 ... 6.25
Gary, Ind. U5 ... 5.65
Geneva, Utah G1 ... 5.65
Ind. Harbor, Ind. I-2 ... 5.65
Ind. Harbor, Ind. Y1 ... 6.15
Johnstown, Pa. B2 ... 5.65
Munhall, Pa. U5 ... 5.65
Pittsburgh J5 ... 5.65
Seattle B3 ... 6.55
Sharon, Pa. S3 ... 5.70
So. Chicago, Ill. U5 ... 5.65
Sparrows Point, Md. B2 ... 5.65
Warren, O. R2 ... 5.65
Youngstown Y1 ... 6.15

PLATES, Open-Hearth Alloy

Claymont, Del. W16 ... 4.85
Coatesville, Pa. L7 ... 5.25
Conshohocken, Pa. A3 ... 5.05
Fontana, Calif. K1 ... 5.70
Gary, Ind. U5 ... 4.75
Johnstown, Pa. B2 ... 4.75
Munhall, Pa. U5 ... 4.75
Sharon, Pa. S3 ... 5.20
So. Chicago, Ill. U5 ... 4.75
Sparrows Point, Md. B2 ... 4.75

FLOOR PLATES

Cleveland J5 ... 4.75
Conshohocken, Pa. A3 ... 4.75
Harrisburg, Pa. C5 ... 5.95
Ind. Harbor, Ind. I-2 ... 4.75
Munhall, Pa. U5 ... 4.75
So. Chicago, Ill. U5 ... 4.75

PLATES, Carbon Steel

Alabama City, Ala. R2 ... 3.70
Aliquippa, Pa. J5 ... 3.70
Ashland, Ky. (15) A10 ... 3.70
Bessemer, Ala. T2 ... 3.70
Clairton, Pa. U5 ... 3.70
Claymont, Del. W16 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville, Pa. L7 ... 4.15
Conshohocken, Pa. A3 ... 4.15
Fairfield, Ala. T2 ... 3.70
Fontana, Calif. (30) K1 ... 4.30
Gary, Ind. U5 ... 3.70
Granite City, Ill. G4 ... 4.40
Geneva, Utah G1 ... 3.70
Harrisburg, Pa. C5 ... 4.95
Houston, Tex. S5 ... 4.10
Ind. Harbor, Ind. I-2, Y1 ... 3.70
Johnstown, Pa. B2 ... 3.70
Lackawanna, N.Y. B2 ... 3.70
Minnequa, Colo. C10 ... 4.50
Munhall, Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon, Pa. S3 ... 3.95
So. Chicago, Ill. U5, W14 ... 3.70
Sparrows Point, Md. B2 ... 3.70
Steubenville, O. W10 ... 3.70
Warren, O. R2 ... 3.70
Weirton, W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70

PLATES, Carbon A. R.

Fontana, Calif. K1 ... 5.45
Geneva, Utah G1 ... 4.85

PLATES, Ingot Iron

Ashland, c.l. (15) A10 ... 3.95
Ashland, lcl. (15) A10 ... 4.45
Cleveland, c.l. R2 ... 4.30
Warren, O. c.l. R2 ... 4.30

BARS, Hot-Rolled Carbon

Alabama City, Ala. R2 ... 3.70
Aliquippa, Pa. J5 ... 3.70
Alton, Ill. (1) L1 ... 3.95
Atlanta, Ga. A11 ... 4.25
Bessemer, Ala. T2 ... 3.70
Buffalo R2 ... 3.70
Canton, O. R2 ... 3.70
Clairton, Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 3.85
Emeryville, Calif. J7 ... 4.45
Fairfield, Ala. T2 ... 3.70
Fontana, Calif. K1 ... 4.40
Gary, Ind. U5 ... 3.70
Houston, Tex. S5 ... 4.10
Ind. Harbor, Ind. I-2, Y1 ... 3.70
Johnstown, Pa. B2 ... 3.70
Kansas City, Mo. S5 ... 4.30
Lackawanna, N.Y. B2 ... 3.70
Los Angeles B3 ... 4.40
Milton, Pa. B6 ... 4.20
Minnequa, Colo. C10 ... 4.15
Niles, Calif. P1 ... 5.05
N. Tonawanda, N.Y. B11 ... 3.70
Pittsburg, Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland, Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
So. Chicago R2, U5, W14 ... 3.70
So. Duquesne, Pa. U5 ... 3.70
So. San Fran., Cal. B3 ... 4.45
Struthers, O. Y1 ... 3.70
Torrance, Calif. C11 ... 4.40
Weirton, W.Va. W6 ... 3.85
Youngstown R2, U5 ... 3.70

BAR SIZE ANGLES, S. SHAPES

Aliquippa, Pa. J5 ... 3.70
Atlanta A11 ... 4.25
Johnstown, Pa. B2 ... 3.70
Lackawanna, N.Y. B2 ... 3.70
Niles, Calif. P1 ... 5.05
Portland, Oreg. O4 ... 4.65
San Francisco S7 ... 4.85

BAR SIZE ANGLES, H.R. CARBON

Bethlehem, Pa. B2 ... 3.90

BARS, Hot-Rolled Alloy

Bethlehem, Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton, O. R2 ... 4.30
Canton, O. (29) T7 ... 3.95
Clairton, Pa. U5 ... 4.30
Detroit R7 ... 4.45
Ecorse, Mich. G5 ... 4.65
Fontana, Calif. K1 ... 5.35
Gary, Ind. U5 ... 4.30
Houston, Tex. S5 ... 4.70
Ind. Harbor, Ind. I-2, Y1 ... 4.30
Johnstown, Pa. B2 ... 4.30
Kansas City, Mo. S5 ... 4.90
Lackawanna, N.Y. B2 ... 4.30
Los Angeles B3 ... 5.35
Massillon, O. R2 ... 4.30
Midland, Pa. C18 ... 4.30
So. Chicago R2, U5, W14 ... 4.30
So. Duquesne, Pa. U5 ... 4.30
Struthers, O. Y1 ... 4.30
Warren, O. C17 ... 4.30
Youngstown U5 ... 4.30

BARS, Reinforcing (Fabricators)

Alabama City, Ala. R2 ... 3.70

BAR SHAPES, Hot-Rolled Alloy

Clairton, Pa. U5 ... 4.55
Gary, Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa, Pa. J5 ... 5.55
Bessemer, Ala. T2 ... 5.55
Bethlehem, Pa. B2 ... 5.55
Clairton, Pa. U5 ... 5.55
Cleveland R2 ... 5.55
Fairfield, Ala. T2 ... 5.55
Fontana, Calif. K1 ... 6.60
Gary, Ind. U5 ... 5.55
Ind. Harbor, Ind. I-2 ... 5.55
Indiana Harbor, Ind. Y1 ... 6.05
Johnstown, Pa. B2 ... 5.55
Lackawanna, N.Y. B2 ... 5.55
Los Angeles B3 ... 6.25
Pittsburgh J5 ... 5.55
Seattle B3 ... 6.30
So. Duquesne, Pa. U5 ... 5.55
So. San Francisco B3 ... 6.30
Struthers, O. Y1 ... 6.05
Youngstown U5 ... 5.55

BARS, Cold-Finished Carbon

Ambridge, Pa. W18 ... 4.55
Beaver Falls, Pa. M12, R2 ... 4.55
Buffalo B5 ... 4.60
Camden, N.J. P13 ... 5.00
Carnegie, Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora, Pa. A7 ... 4.55
Elyria, O. W8 ... 4.55
Franklin Park, Ill. N5 ... 4.55
Gary, Ind. R2 ... 4.55
Green Bay, Wis. F7 ... 4.55
Hammond, Ind. L2, M13 ... 4.55
Hartford, Conn. R2 ... 5.10
Harvey, Ill. B5 ... 4.55
Los Angeles R2 ... 6.00
Mansfield, Mass. B5 ... 5.10
Massillon, O. R2, R8 ... 4.55
Monaca, Pa. S17 ... 4.55
Newark, N.J. W18 ... 5.00
Plymouth, Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam, Conn. W18 ... 5.10
Readville, Mass. C14 ... 5.10
St. Louis, Mo. M5 ... 4.95
So. Chicago, Ill. W14 ... 4.55
Spring City, Pa. (5) K3 ... 5.00
Struthers, O. Y1 ... 4.55
Waukegan, Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55

BARS, Cold-Finished Alloy

Ambridge, Pa. W18 ... 5.40
Beaver Falls, Pa. M12 ... 5.40
Bethlehem, Pa. B2 ... 5.40
Buffalo B5 ... 5.40
Camden, N.J. P13 ... 5.80
Canton, O. R2 ... 5.40
Canton, O. (29) T7 ... 4.90
Carnegie, Pa. C12 ... 5.40
Chicago W18 ... 5.40
Cleveland A7 ... 5.45
Cleveland C20 ... 5.40
Detroit P17 ... 5.55
Donora, Pa. A7 ... 5.45
Elyria, O. W8 ... 5.40
Gary, Ind. R2 ... 5.40
Hammond, Ind. L2, M13 ... 5.40
Hartford, Conn. R2 ... 5.85
Harvey, Ill. B5 ... 5.40
Lackawanna, N.Y. B2 ... 5.40
Mansfield, Mass. B5 ... 5.85
Massillon, O. R2, R8 ... 5.40
Midland, Pa. C18 ... 5.40
Monaca, Pa. S17 ... 5.40
Newark, N.J. W18 ... 5.75
Plymouth, Mich. P5 ... 5.60
So. Chicago, Ill. R2, W14 ... 5.40
Struthers, O. Y1 ... 5.40
Warren, O. C17 ... 5.40
Waukegan, Ill. A7 ... 5.45
Worcester, Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40

RAIL STEEL BARS

Chicago Hts. (3, 4) I-2, C2 ... 4.75
Franklin, Pa. (3, 4) F5 ... 4.75
Fort Worth, Tex. (26) T4 ... 5.40
Huntingtn, W.Va. (3) W7 ... 5.50
Marion, O. (3) P11 ... 4.75
Moline, Ill. (3) R2 ... 3.80
Tonawanda (3, 4) B12 ... 4.75
Williamsport (3) S19 ... 5.00
Williamsport (4) S19 ... 5.10

BARS, Wrought Iron

Dover, N.J. (Staybolt) U1 ... 15.00
Dover, (Eng. Bolt) U1 ... 13.50
Dover (Wrgt. Iron) U1 ... 12.25
Economy, Pa. (S.R.) B14 ... 9.60
Economy, Pa. (D.R.) B14 ... 11.90
Economy (Staybolt) B14 ... 12.20
McK. Rks. (Staybolt) L5 ... 14.50
McK. Rks. (S.R.) L5 ... 9.60
McK. Rks. (D.R.) L5 ... 13.00

BARS, Reinforcing (Fabricators)

Alton, Ill. (6) L1 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville, Calif. J7 ... 4.45
Fairfield, Ala. T2 ... 3.70
Fontana, Calif. K1 ... 4.40
Gary, Ind. U5 ... 3.70
Houston, Tex. S5 ... 4.10
Ind. Harbor, Ind. I-2, Y1 ... 3.70
Johnstown, Pa. B2 ... 3.70
Kansas City, Mo. S5 ... 4.30
Lackawanna, N.Y. B2 ... 3.70
Los Angeles B3 ... 4.40
Milton, Pa. B6 ... 4.20
Minnequa, Colo. C10 ... 4.50
Niles, Calif. P1 ... 5.05
Pittsburg, Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland, Oreg. O4 ... 4.65
Sand Springs, Okla. S5 ... 4.60
Seattle B3, N14 ... 4.45
So. Chicago, Ill. R2 ... 3.70
So. Duquesne, Pa. U5 ... 3.70
So. San Francisco B3 ... 4.45
Sparrows Point, Md. B2 ... 3.70
Struthers, O. Y1 ... 3.70
Torrance, Calif. C11 ... 4.40
Youngstown R2, U5 ... 3.70

BARS, Reinforcing
(Fabricated to Consumers)

Huntington, W.Va. W7 ... 5.50
Johnstown, ¼-1" B2 ... 4.75
Los Angeles B3 ... 5.45
Marion, O. P11 ... 5.00
Seattle B3, N14 ... 5.55
So. San Francisco B3 ... 5.45
Sparrows Pt., ¼-1" B2 ... 4.75
Williamsport, Pa. S19 ... 5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

Alabama City, Ala. R2 ... 3.60
Ashland, Ky. (8) A10 ... 3.60
Butler, Pa. A10 ... 3.60
Cleveland J5, R2 ... 3.60
Conshohocken, Pa. A3 ... 4.00
Detroit M1 ... 4.40
Ecorse, Mich. (8) G5 ... 3.80
Fairfield, Ala. T2 ... 3.60
Fontana, Calif. K1 ... 4.55
Gary, Ind. U5 ... 3.60
Geneva, Utah G1 ... 3.70
Granite City, Ill. G4 ... 4.30
Ind. Harbor, Ind. I-2, Y1 ... 3.60
Irvin, Pa. U5 ... 3.60
Lackawanna, N.Y. B2 ... 3.60
Munhall, Pa. U5 ... 3.60
Niles, O. N12 ... 5.25
Pittsburg, Calif. C11 ... 4.30
Pittsburgh J5 ... 3.60
Sharon, Pa. S3 ... 4.00
So. Chicago, Ill. W14 ... 3.60
Sparrows Point, Md. B2 ... 3.60
Steubenville, O. W10 ... 3.60
Torrance, Calif. C11 ... 4.30
Warren, O. R2 ... 3.60
Weirton, W.Va. W6 ... 3.60
West Leechburg, Pa. A4 ... 3.75
Youngstown U5, Y1 ... 3.60

SHEETS, H.R. (19 gage)

Alabama City, Ala. R2 ... 4.75
Dover, O. R1 ... 5.65
Ind. Harbor, Ind. I-2 ... 5.40
Mansfield, O. E6 ... 5.65
Niles, O. N12 ... 5.75
Torrance, Calif. C11 ... 5.40

SHEETS, H.R (14-ga., heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ... 5.40
Conshohocken, Pa. A3 ... 5.65
Ecorse, Mich. G5 ... 5.95
Fairfield, Ala. T2 ... 5.40
Fontana, Calif. K1 ... 6.35
Gary, Ind. U5 ... 5.40
Ind. Harbor, Ind. I-2 ... 5.40
Indiana Harbor, Ind. Y1 ... 5.90
Irvin, Pa. U5 ... 5.40
Lackawanna (35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon, Pa. S3 ... 5.40
So. Chicago, Ill. U5 ... 5.40
Sparrows Point (36) B2 ... 5.40
Warren, O. R2 ... 5.40
Weirton, W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown Y1 ... 5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ... 6.55
Ecorse, Mich. G5 ... 7.10
Fontana, Calif. K1 ... 7.50
Gary, Ind. U5 ... 6.55
Indiana Harbor, Ind. Y1 ... 7.05
Indiana Harbor, Ind. I-2 ... 6.55
Irvin, Pa. U5 ... 6.55
Lackawanna (37) B2 ... 6.55
Pittsburgh J5 ... 6.55
Sparrows Point (38) B2 ... 6.55
Warren, O. R2 ... 6.55
Weirton, W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala., R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.00

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	6.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

ROOFING SHORT TERNES (8 lb coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, Lt. Coated Ternes, 6lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Comercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanived Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fiarfield,Ala. T2	5.30
Fontana,Cal. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
N.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10)S15	10.75

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon	
Pawtucket,R.I.(11)	NS
Pawtucket,R.I.(12)	NS
Sharon,Pa. S3	...
Worcester,Mass. A7	...
Youngstown C8	...

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	5.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.66
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8, (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Koppers Co. Inc.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta, A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora A7	5.70	6.15
Duluth A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.96	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvle MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.,Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt, B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Cleveland A7	8.55	8.80
Donora,Pa. A7	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
NewHaven A7	8.85	9.10
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt, B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Trenton,N.J. A7	8.85	9.10
Waukegan,Ill. A7	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill.(1) L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	4.85
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8ga. I-1	5.50
No. Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R5	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.50
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill.(1) L1	6.25
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	7.10
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	7.10
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. MS	132
Donora,Pa. A7	130
Duluth A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	267
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Chicago W13	123
Crawfordsville MS	132
Donora,Pa. A7	123
Duluth A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.15

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	130
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburgh,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, F14	9.85
Seattle B3	10.10

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield,S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Corp.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

TOOL STEELS

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	140.00
Extra Carbon	27.00	18W,4Cr,2V,9Co	217.50
Spec. Carbon	32.50	19W,4Cr,2V,7Co	217.50
Oil Hardening	35.00	18.25W,4.25Cr,1V,4.75Co	185.50
Cr Hot Wrk	35.00	20.25W,4.25Cr,1.6V,12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,8.5Mo	78.50
18W,4Cr,1V	123.50	6.4W,4.5Cr,1.9V,5Mo	87.00
18W,4Cr,2V	138.00	6W,4Cr,3V,6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (elec. furn. billet, 5.40c); to consumers, 6.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

American Armament Demands Speed...
Speed Demands American Phillips Fastening
GET YOUR GUN
and get going!
4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

Get More Speed...More Accuracy...Firmer Fastenings... the American Phillips Way

IF you've got a D-O, then "give it the gun"... the *American Phillips* gun ... and watch the assemblies roll out faster than with any other fastening method ... *as much as 50% faster!*

Power-driven American Phillips fastenings are easier and quicker *for anyone* to make ... because recessed screwhead and 4-winged driver align automatically, and drive straight to a tight, flush fastening the *first* time, *every* time.

Have American engineer this top speed and accuracy into *your* assembly departments ... with any Phillips product, including machine screws, SEMS assemblies, stove bolts, tapping screws, thread-cutting screws, wood screws, roll thread, thread-forming, thread-cutting and self-locking fastenings. *Write:*

AMERICAN SCREW COMPANY

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic and Norristown, Pa.

Warehouse and offices at Chicago

1838

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.13	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅝", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼" and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜"; following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ¼-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛". 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain, N8; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Strip—Cold-Rolled Carbon Base Both Sides	Strip—Cu Base Both Sides	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Sheets—Cu Base Both Sides
302	....	....	....	....	19.75	27.50	77.00
304	25.00	28.00–29.50	....	....	20.75–24.50	27.50	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	31.50–34.00	....	....	26.00	36.50	....
317	34.50	39.00	....	....	....	....	....
318	38.50	38.00	....	....	....	....	....
321	26.50	31.00	....	....	23.00	33.00	111.00
347	27.50	30.50–32.00	....	....	24.00	33.50	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.25	44.25	41.00	54.00	....	....	....
Inconel	41.00	53.50	....	....	....	....	165.00
Monel	34.75	45.75	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, steel, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 15
- ⅝-in. & ⅞-in. 18.5
- 1-in. and larger 17.5

Longer than 6 in.:
- All diams. 14

Lag bolts, all diams.:
- 6 in. and shorter 23
- over 6 in. long 21

Ribbed Necked Carriage 18.5
Blank 34
Plow 34
Step, Elevator, Tap, and Sleigh Shoe 21
Tire bolts 12
Boiler & Fitting-Up bolts 31

NUTS

H.P. & C.P. Square:	Reg.	Heavy
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1½-in.	9	1
1⅝ in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1½-in.	12	2
1⅝ in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
¼-in. & smaller		35
5/16-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish .....48 & 10
Plated finishes....31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 42
- ¾-in. through 1 in. ... 34

Longer than 6 in.:
- ⅝-in. & smaller 26
- ¾-in. through 1 in. ... 4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 35
¼-in. diam. & larger.... 16
N.F. thread, all diams... 10

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.85c
⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-50c.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4.5	40	21.50
3	40	22.61
2½	24,30	23.15
2	24,30	25.36

CARBON

40	100,110	8.03
35	100,110	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03
14	60,72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.00	36.50	31.25
303	43.00	40.00	33.75
304	43.00	38.50	32.75
309	55.50	54.50	44.25
316	56.50	58.50	48.75
321	49.00	48.00	36.75
347	53.50	52.00	41.25
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Baltimore, Types 301 through 347 sheet, except 309 E2.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502, S18.

Cleveland, strip A7.

Detroit, strip, except Types 309, 321, 416, 420, 501 and 502 M1.

Dunkirk,N.Y., bars, wire A4.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip C18.

McKeesport, Pa., bars, sheets except Type 416 U5.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., bars and strip, except 55.50c for Type 309 strip and 44.75c for Type 309 bars, C4.

Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.00c and bars 44.75c, J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 61.50c, strip 63.00c, W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xylol ..25.00-33.50
Per ton bulk, ovens
Sulphate of ammonia.$32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25
Do., less than carlots..18.00
Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron ..... Cents
- 98+% Fe, carlots.. 16.00
- Swedish, c.i.f. New York, in bags...7.40-8.50

Electrolytic Iron:
- Annealed, 99.5% Fe 42.50
- Unannealed, 99 + % Fe 36.50
- Unannealed, 99 + % Fe(minus 325 mesh) 58.50

Powder Flakes 48.50

Carbonyl Iron:
- 97.9-99.8%, size 5 to 10 microns..$3.00-148.00

Aluminum:
- Carlots, freight allowed 29.50
- Atomized, 500 lb drums, freight allowed 33.50

Brass, 10-ton lots 30.00-33.25
Bronze, 10-ton lots 51.25-60.00
Phosphor-Copper, 10 tons 50.00
Copper:
- Electrolytic 43.25
- Reduced 33.75-37.00

Lead 25.50
Manganese:
- Minus 100-mesh 57.00
- Minus 35 mesh 52.00
- Minus 200 mesh 62.00

Nickel unannealed 83.00
Nickel-Silver, 10-ton lots 44.00
Silicon 38.50
Solder (plus cost of metal) 8.50
Stainless Steel, 302 ... 83.00
Tin $1.935
Zinc, 10-ton lots.23.00-30.50
Tungsten: Dollars
- 99%, minus 80 to 200 mesh, freight allowed: 1000 lb and over . 4.00
- Less than 1000 lb .. 4.15

98.8% minus 65 mesh, freight allowed:
- 1000 lb. and over... 4.15
- less than 1000 lb.... 4.25

Molybdenum:
- 99%, minus 80 to 200 mesh, over 500 lb 2.85
- 200 to 500 lb 3.10
- less than 200 lb .. 3.25

Chromium, electrolytic 99% Cr min. 3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll.fur. .$14.50-15.00
Connellsvll,fdry. .17.00-18.00
New River, foundry....19.50
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens $22.75
Everett, Mass., ovens
- New England, del..124.80

Chicago, ovens 21.00
- Chicago, del. .....†22.45
- Detroit, del. 24.91

Terre Haute, ovens...22.50
Milwaukee, ovens 23.75
Indianapolis, ovens....22.75
- Chicago, del. 26.62
- Cincinnati, del. 25.67
- Detroit, del. 26.65

Ironton, O., ovens 21.50
- Cincinnati, del. 24.06

Painesville, O., ovens..24.00
- Buffalo, del. 26.12
- Cleveland, del. 25.72

Erie, Pa., ovens 23.50
Birmingham, ovens ...20.30
- Birmingham, del. ...21.69

Philadelphia, ovens ...22.70
Neville Island,Pa.,ovens 23.00
Swedeland, Pa., ovens.22.00
St. Louis, ovens 24.25
- St. Louis, del. 25.38

Portsmouth, O., ovens.21.50
- Cincinnati, del. 24.06

Detroit, ovens 24.00
- Detroit, del. .....•25.00
- Buffalo, del. 26.69
- Flint, del. 26.44
- Pontiac, del. 25.39
- Saginaw, del. 26.75

Includes representative switching charge of: •, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How SILICOMANGANESE Saves Furnace Time . . . Produces Better, Cleaner Steel

Silicomanganese is used by the steel industry as a furnace block* and deoxidizer, and also for manganese additions.

The cleanness and quality of steel depend largely on how well it has been deoxidized. Deoxidation also greatly influences the physical properties of steel for rolling and subsequent fabrication. Silicomanganese combines two active deoxidizers in a single alloy and it has proved to be a more effective deoxidizer than silicon or manganese alloys added separately. This combination alloy contains silicon and manganese in the correct proportion (approximately 1 to 3.5) to be most effective in reducing the oxygen content of the bath to a low level. The use of silicomanganese produces cleaner steel, saves furnace time, and gives high alloy recovery for manganese additions.

Gets More Oxygen Out of Bath

When silicomanganese is used for blocking and deoxidation, the combined effect of silicon and manganese lowers the oxygen content to a greater degree than silicon alone. This is due to the fact that the amount of oxygen in equilibrium with a given amount of silicon is lower in iron-silicon-manganese alloys than it is in plain iron-silicon alloys, as shown in Fig. 1.

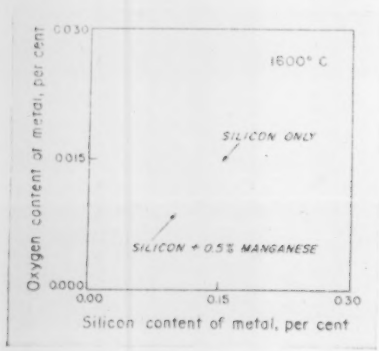


Fig. 1. Limit of solubility of oxygen in iron-silicon alloys, plain and with 0.50 per cent manganese at 1600° C.

*The initial deoxidation of steel, frequently referred to as the furnace block, stops the carbon-oxygen reaction in the furnace. This arrests the carbon drop immediately and makes it possible to secure close control of analysis. If the oxygen content of the metal is reduced well below the level established by the carbon-oxygen reaction, initial deoxidation is accomplished.

Less Inclusions, Cleaner Steel

In addition to lowering the oxygen content, silicomanganese has a specifically beneficial effect on inclusions. The inclusions in a steel depend in large part on how low the carbon content (or how high the oxygen content) is before blocking. The lower the carbon, the dirtier the final steel, almost regardless of the subsequent deoxidation treatment. Since silicomanganese has a low carbon content, it is not necessary to drive the carbon as low (or make the oxygen as high) as when high-carbon or standard ferromanganese is used, so that the final steel is cleaner and has better working properties. The improved cleanliness resulting from silicomanganese is usually noticeable in higher carbon steels, but is outstanding in steels below 0.25 per cent carbon where inclusions and surface defects are a vital problem and where the time saved by blocking at a higher carbon level is significant.

Fast Solubility In Bath

Because of the high concentration of active elements in silicomanganese, less time is required to effect solution of this alloy than when equivalent amounts of silicon and manganese are used separately in the form of ferrosilicon and ferromanganese.

For example, compare these typical analyses of silicomanganese, standard ferromanganese, and 50 per cent ferrosilicon:

	Silicomanganese, %	Standard Ferromanganese, %	50% Ferrosilicon, %
Manganese	66.5	80	—
Silicon	19	—	50
Carbon	1.5	7	—
Iron, approx.	13	13	50

From this it can be seen that 1,000 lb. of silicomanganese would contain 190 lb. of silicon and 665 lb. of manganese. These amounts of silicon and manganese would require 380 lb. of 50 per cent ferrosilicon and 830 lb. of standard ferromanganese, or a total of 1,210 lb. Obviously it is easier and faster to dissolve 1,000 lb. of the combination alloy silicomanganese than 1,210 lb. of these separate silicon and manganese alloys.

Lower Carbon Content

Silicomanganese contains less carbon than any combination of ferrosilicon and standard ferromanganese. Therefore, the carbon-oxygen reaction in the bath can be stopped earlier when silicomanganese is used for blocking. Heats can be blocked at higher carbon levels and hence lower oxygen contents, and the amount of deoxidation required is less.

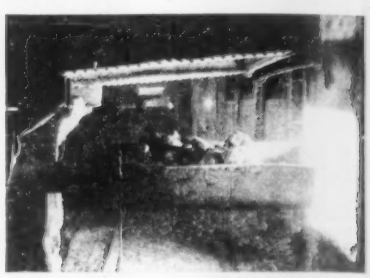


Fig. 2. Charging silicomanganese into an open-hearth furnace.

Saves Furnace Time

Because of the advantages outlined, silicomanganese can save as much as 20 minutes per melt in the production of open-hearth steel. For low-carbon steel, an even greater saving in time can be realized.

For Producing Engineering Steels

Silicomanganese is also used for alloy additions of manganese, particularly in the production of engineering steels containing 0.10 to 0.50 per cent carbon.

When manganese or other oxidizable additions, such as chromium, must be made to the bath, the use of a block provides a higher alloy recovery. Silicomanganese introduces manganese with the silicon and the usual recovery of this manganese will range from 70 to 85 per cent.

Metallurgical Service Available

Ask to have one of our metallurgists call and explain more fully the advantages of silicomanganese as a furnace block and deoxidizer. He will be glad to help you with the use of ELECTROMET silicomanganese. This alloy contains 65 to 68 per cent manganese and is produced in maximum 1.50, 2.00, and 3.00 per cent carbon grades. All grades are furnished in a lump size of 75 lb. x 2 in. and in a crushed size of 2 in. x down. Write, wire, or phone the nearest ELECTROMET office.

The word "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.23	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	7.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	6.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.06	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††[3]	6.00	6.26	7.56
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††[3]	5.80	6.06	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[3]	5.78	5.93	7.13
St. L. (w'hse)	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[3]	5.58	5.73	6.93
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Omaha, Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'hm (city)	5.75	6.55	6.90[3]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75[3]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[3]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85[3]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80[4]	8.90[3]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60[3]	9.20[3]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded; ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [3]—500 to 1499 lb; [4]—450 to 1499 lb; [5]—3500 lb and over; [6]—1000 to 1999 lb.

REFRACTORIES

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa. $99.60 Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O. $66.

Wire Cut: Chester, Wellsville, O., $64.

MALLEABLE BUNG BRICK

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

BASIC BRICK

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

MAGNESITE

Per net ton, Chewelah, Wash. Domestic deadburned, ¾" grains; bulk, $36.30; single paper bags, $41.80.

DOLOMITE

Per net ton. Domestic, burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Nario, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950 in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$38-$39
Domestic scheelite, del.	nominal

MANGANESE ORE

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

	Indian and African	
48%	2.8:1	$32.50
48%	3:1	35.00-36.00
48%	no ratio	26.00
	South African Transvaal	
44%	no ratio	$24.00-25.00
45%	no ratio	20.00
48%	no ratio	$31.00-32.00
50%	no ratio	28.00-28.50
	Brazilian	
44%	2.5:1 lump	$32.00
	Rhodesian	
45%	no ratio	$20.00-21.00
48%	no ratio	26.00
48%	3:1 lump	35.00-36.00
	Domestic—rail nearest seller	
48%	3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb. molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., Welland, Ont., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lot 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump bulk, 1.50% C grade, 18.20% Si 9.90c per lb of alloy, carload packed, 10.65c,, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2 from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

"SM" Ferrochrome: (Cr 60-65% Si 4-6%, Mn

(*Please turn to page 174*)

Nonferrous Metals Go to War

Supply outlook for civilian goods producers bleak. Rise in metals output lags behind increase in requirements. Imports limited by higher prices in world markets

By FRANK R. BRIGGS
Associate Editor

GREATER tonnages of nonferrous metals will be available this year, but you will find it more difficult to cover your needs. The producing industry is steadily losing ground to the growth in demand.

Domestic copper, lead and zinc production will rise slightly from 1950 levels. Aluminum and magnesium output will jump sharply. Titanium, relatively new as a structural material, will expand rapidly percentagewise. Nickel is scheduled for a moderate increase. Less tin, most of which is imported, will be available in 1951 than in 1950.

But the increased output in each case will be less than the rise in demand because of mobilization requirements, stockpiling and expanding need for civilian production.

Less for Butter—That means that civilian producers will not get all they want. Defense requirements will continue to mount. The government is trying to build up its stockpiles. Restrictions on metals use in less essential products will grow tighter.

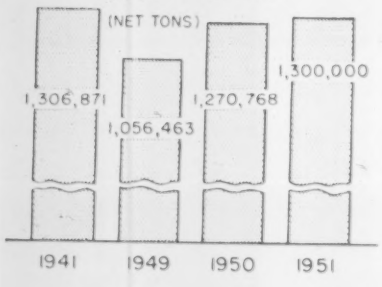
Why not expand capacity? Or imports?

That's possible for some nonferrous metals, but not for all.

Fabricating, refining and smelting facilities for copper, lead and zinc are adequate. The shortage in these metals arises from producers' inability to step up mine operations. Ore is the bottleneck.

Imports are difficult because foreign prices are higher than domestic quotations. Shipments from abroad, once substantial, now are only a trickle. A possible solution may be for the government to purchase at the higher "world" price and resell at the fixed domestic price, absorbing the difference.

Copper Production



Only Pennies More—Domestic copper production will rise only about 30,000 tons this year, less than one-quarter of 1 per cent, to 1,300,000 tons. Expansion programs underway or projected may lift output to 1,450,000 tons by 1954.

Domestic copper output is averaging about 110,000 tons monthly. Imports add 45,000 tons.

Before Korea, industrial consumption was averaging around 130,000 tons a month and 20,000 tons were being stockpiled. Supply and demand were in fair balance.

When defense needs were added, the shortage developed. Exact defense requirements are not revealed by the government. Trade sources estimate 15 to 16 per cent of the total copper supply was going into defense work in January and February and expect this figure will more than double during the second half. Stockpiling has been cut 50 per cent and the Munitions Board will review the supply situation at three-week intervals.

Needed: More Ore — Expansion is needed primarily in mining and concentrating facilities. Mine manpower is short and will present a serious problem in expanding mine output.

Domestic producers are expanding their mining facilities as much as feasible, but the increase in production is likely to be small. The average grade of ore in this country is below 1 per cent copper content and it is believed that all ore bodies worthy of development are known.

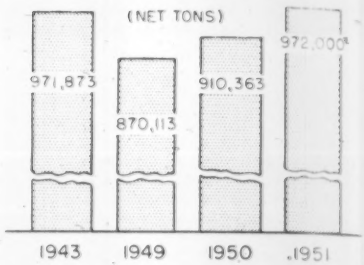
Copper Cities Mining Co., Miami Copper Co. subsidiary, is bringing into production a deposit in the Globe-Miami district in Arizona with a capacity of about 22,500 tons of copper a year. Kennecott Copper Corp. is increasing operations at its electrolytic copper refinery at Garfield, Utah; production reached 11,000 tons a month by late last year; capacity is 12,000 tons. The company will increase production at its Ray, Ariz., mine from the present rate of 8000 tons of ore daily to 15,000 tons by late summer.

Copper Range Co., Boston, is developing its White Pine property in Ontonagon county, Mich. It is one of the larger undeveloped copper properties in the United States. The company has set an annual production goal of 75,000 tons within three years.

Phelps Dodge Corp., New York, is considering development of the low-grade Bisbee east ore property, Warren mining district, Arizona. Magna Copper Co., New York, will expand operations at its San Manuel mine in Arizona, but the higher rate will not be attained this year. American Metal Co. Ltd., New York, is building a power plant at Carteret, N. J., which will increase productive capacity at its copper refinery about 10 per cent.

Increase the Flow—A campaign is under way to remove the 2-cent tariff on copper imports to encourage the flow of metal from foreign sources. A number of expansion programs are under way in other countries. Rhokana Corp. and its affiliates are increasing production in Rhodesia. Noranda Mines Ltd., Toronto, will develop a large low-grade copper ore body in the Gaspe Peninsula section of Quebec.

Zinc Production



Marginal Mines—Lead and zinc production will be increased modestly as the high price level encourages the reopening of some high-cost producing properties. But there still are many marginal mines that cannot operate at a profit.

Most producers dislike the idea of premium price or subsidy plans except as a last resort. The government has a $10 million program for encouraging exploration for strategic and critical metals, but it is not expected to bring any early increase in production.

Current primary and secondary slab zinc production is at an annual rate of about 972,000 tons. That represents a moderate increase over 910,000 tons in 1950 and 870,000 tons in 1949. As there is about 60,000 tons of secondary zinc involved, smelters will need 910,000 tons of recoverable zinc in concentrates this year. Zinc pigment plants require an additional 130,000 tons of zinc from concentrates, raising total requirements of recoverable zinc from concentrates to 1,040,000 tons.

Zinc mine production in the United States may reach 700,000 tons. Imports are not likely to exceed the 1950 figure of 230,000 tons. The indicated deficit in recoverable zinc is 110,000 tons if current production rates are to be maintained.

Expansion Programs Under Way—Several projects to increase domestic output are under way. Calumet & Hecla Consolidated Copper Co., Boston, started development of a zinc-lead mine at Shullsburg, Wis., in 1948. Output is about 650 tons daily now and is scheduled to reach 1200 tons daily by mid-year.

American Metal Co. Ltd., New York, is installing a large sintering machine at Blackwell, Okla., zinc smelter which will increase production some, but is primarily for simplification of operations in that plant. Kennecott Copper Corp. is increasing ore production at its Oswaldo zinc

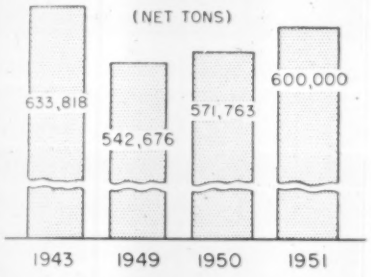
project in New Mexico by installation of improved equipment.

Work is progressing on New Jersey Zinc Co.'s new zinc mining property at Friedenville, Pa. Concentrates will go to the company's Palmerton, Pa., smelter. New Jersey Zinc bought a large mining property in Virginia which will be developed.

Ten Years' Expansion in Two—St. Joseph Lead Co., New York, is accelerating its $15 million expansion program, originally planned for a 10-year period, 1950-1960. Production at its Edwards and Balmat zinc mines in New York is well under way. The ultimate 50 per cent increase in output will not be obtained until 1952, but some increased production will be available this year. At its Josephtown, Pa., electrothermic zinc smelter a new electric furnace and secondary zinc treatment plant may be completed in 1952. The company also is building a new slag zinc furnace at its Herculaneum, Mo., plant.

St. Joseph Lead is opening a new lead-zinc mine in Washington county, Missouri, on a 2000-tons of ore a day basis. A new ore deposit at Hayden Creek in southeast Missouri is to be equipped with a 2000-ton sink-float plant and other equipment. Output of the company's lead smelter at Herculaneum, Mo., will be increased from 65,000 tons to 100,000 tons a year, starting in 1953.

Lead Production



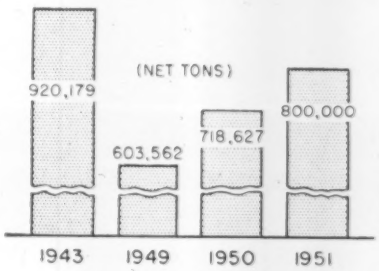
Getting the Lead Out—The increase in production of ore from domestic mines will be about 20,000 tons recoverable lead. This forecast is based on the assumption that mines will be able to maintain an adequate labor supply and to get materials and supplies needed.

Production of primary and secondary lead may reach 600,000 tons in 1951 compared with 542,676 tons in 1949.

The more favorable market for lead abroad may result in a sharp reduction in imports this year unless it is quickly adjusted. Felix E. Wormser, vice president, St. Joseph Lead, says that without government price compulsion we would only have one price in the United States today, which would be a competitive price to meet the foreign price plus duty. The present dual price situation can be adjusted by the government permitting the domestic price to seek a foreign market level or by the government buying all the needed imports and subsequently allocating them to industry as was done during the last war.

Nickel, Nickel — Production of nickel in Canada is at maximum capacity and is expected to be larger in 1951 than in any peacetime year. Additional supplies will be available from the United States government-owned nickel properties in Cuba which are being reactivated and will be in production sometime in the fourth quarter of 1951. The pure nickel oxide produced at the Nicaro project is acceptable for the production of steel and alloys. Mining Equipment Corp., New York, subsidiary of N. V. Billiton, will operate the plant.

Aluminum Production



Above the Peak—Expansion in aluminum production will be large. This year's output is expected to reach 800,000 tons, or more than 10 per cent above the 718,000 tons produced in 1950. But it will not be until 1952 that full effect of current expansion programs will be felt when output is expected to reach 1,100,000 tons, well above the World War II peak.

But don't expect to obtain aluminum for nonessential civilian work for a while. Defense needs will grow. Because of the importance of mobility in present day military operations, aluminum will be in demand not only for aircraft but for other military transportation items and many other military uses.

Alcoa Boosts — Aluminum Co. of America will increase its output of aluminum for defense by about 50 per cent. A "quick action" plan to make the light metal for government stockpiles at a rate of 79,000 tons a year will use standby facilities and high-cost electric power at Messena, N. Y., and Badin, N. C. Alcoa will erect permanent new capacity of 120,000 tons at a cost of between $130 and $150 million. Facilities will be in additions at Point Comfort, Tex., and at a new plant to be built at a site not yet disclosed.

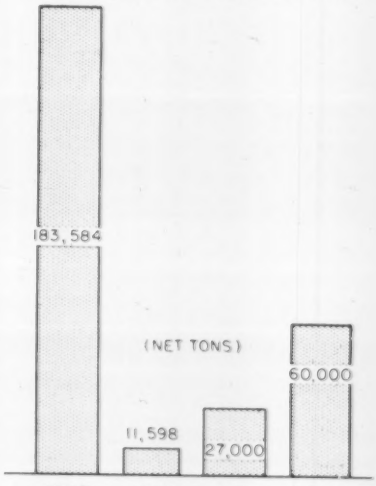
Reynolds Builds—An $80 million reduction plant will be erected by Reynolds Metals Co. near Corpus Christi, Tex., to produce 75,000 tons of pig aluminum annually. Plant will start operating late this year. Reynolds also is expanding its Jones Mill, Ark., plant by 25,000 tons annually.

Kaiser Enters Extrusion Industry—Kaiser Aluminum & Chemical Corp. not only is expanding its productive capacity but also is entering the aluminum extrusion field. It is building a new plant at Halethorpe, Md.

Kaiser will raise its primary capacity to 270,000 tons a year by building a reduction plant at New Orleans capable of producing 100,000 tons a year by mid-1952.

Ever since last fall when the first materials order affecting nonferrous metals was issued, NPA M orders have been cutting deeper into the metals industry. This year, although there will be more metals available, you'll get less for civilian products. As the M orders loom larger and larger on the nonferrous horizon, the reflective M-m-m-m's coming from the industry will grow deeper and sadder

Magnesium Production



Magnesium: Up Like a Rocket—The magnesium expansion program is the greatest percentagewise of any of the nonferrous metals. From 11,598 tons in 1949, production will rise to at least 60,000 tons in 1951 and to 120,000 tons in 1952. Most of the metal will go into defense goods.

Government-owned plants, with 100,000-ton capacity, are being reactivated.

Dow Chemical Co. will have the Valesco, Tex., plant, with 36,000 tons capacity, operating within a few weeks. Kaiser is reactivating the Manteco, Calif., plant with 10,000 tons. Pacific Northwest Alloys Inc. will operate the Spokane plant with capacity of 24,000 tons. All will be sold to the government. The stockpile also will receive 56,000 tons in the next two years from plants reactivated by Diamond Alkali Co. at Painesville, O., and the New England Lime Co. at Wingdale, N. Y., and Canaan, Conn.

ANY SPEED YOU NEED

1 TO 60 H.P.

WITH THE PHILADELPHIA GEARMOTOR

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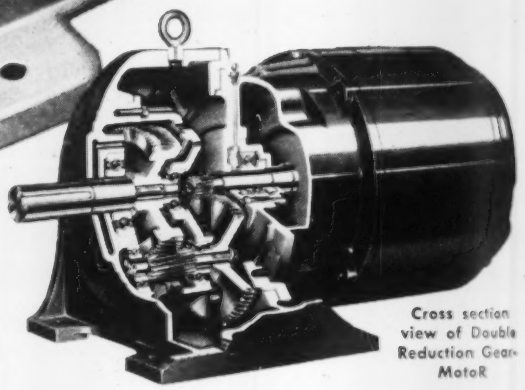

Cross section view of Double Reduction GearMotoR

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 43.25c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.00c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 30.00-30.50c; No. 12 foundry alloy (No. 2 grade) 29.50-30.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 32.00c; grade 2, 30.00-30.25c; grade 3, 29.00-29.50c; grade 4, 28.50-29.00c. Prices include freight at c.l. rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt, 182.00c.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 50.50c; 25-lb pigs, 53.15c; "XX" nickel shot, 54.15c; "F" nickel shot or ingots, for addition to cast iron, 51.00c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $216-$220 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York 90.16c per oz.
Platinum: $90-$93 per ounce from refineries.
Palladium: $24 per troy ounce.
Iridium: $200 per troy ounce.
Titanium, (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 41.03; yellow brass 37.84; commercial bronze, 95%, 40.99; 90%, 40.55; red brass, 85%, 39.59; 80%, 39.15; best quality, 39.15; nickel silver, 18%, 51.91-52.36; phosphor-bronze grade A, 5%, 60.20-62.82.

Rod: Copper, hot-rolled 36.88; cold-drawn 38.13; yellow brass free cutting, 32.23; commercial bronze, 95%, 40.68; 90%, 40.24; red brass 85%, 39.28; 80%, 38.84.

Seamless Tubing: Copper 41.07; yellow brass 40.85; commercial bronze, 90%, 43.21; red brass, 85% 42.50.

Wire: Yellow brass 38.13; commercial bronze, 95%, 41.28; 90%, 40.84; red brass, 85%, 39.88; 80%, 39.44; best quality brass, 39.44.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60, l.c.l. 30.10, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	...	...
0.156-0.188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.0	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 71.50c. Strip, cold-rolled, 77.50c. Rods and shapes, 67.50c. Plates, 69.50c. Seamless tubes, 100.50c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 57.00c. Strip, cold-rolled 60.00c. Rods and shapes, 55.00c. Plates, 56.00c. Seamless tubes, 90.00c. Shot and blocks, 50.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl, 33.00c up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 20,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.00	23.00	22.25
Yellow Brass	20.125	19.875	18.75
Commercial Bronze			
95%	21.875	21.625	21.125
90%	21.75	21.50	21.00
Red brass			
85%	21.50	21.25	20.75
80%	21.375	21.125	20.625
Muntz metal	19.00	18.75	18.25
Nickel, silver, 10%	22.25	22.00	11.125
Phos. bronze, A	24.00	23.75	22.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 25.00; No. 2 copper 22.00; light copper 20.00; composition red brass 22.50-23.00; radiators 17.75-18.00; heavy yellow brass 17.75-18.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.50*; No. 2 copper 20.00*; light copper 19.00*; refinery brass (60% copper) per dry copper content 19.50.

* Nominal.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 21.50; No. 2 20.00; light copper 19.00; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 13.50-14.00; new brass clippings 17.50-18.00; No. 1 brass rod turnings 16.00-16.50; light brass 13.50-14.00; clean heavy yellow brass 15.25-15.75; new brass rod ends 16.50-17.00; auto radiators 15.50-16.00; cocks and faucets, 17.50-18.00; brass pipe 18.50-19.00.

Lead: Heavy 15.00-15.25; battery plates 8.75-9.00; linotype and stereotype 15.50-16.00; electrotype 15.00-15.25; mixed babbitt 12.25-12.50.

Zinc: Old zinc 11.00-11.25; new die cast scrap 10.75-11.00; old die cast scrap 8.00-8.25.

Tin: No. 1 pewter 80.00-85.00; block tin pipe 125.00; No. 1 babbitt 75.00-80.00.

Aluminum: Clippings 2S 19.00-19.50; old sheets 15.50-16.00; crankcase 15.50-16.00; borings and turnings 12.00-12.50.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Feb. 28	24.50	16.80	17.50	182.00	19.00	42.00	50.50	90.16
Feb. 26-27	24.50	16.80	17.50	182.625	19.00	42.00	50.50	90.16
Feb. 13-24	24.50	16.80	17.50	183.00	19.00	42.00	50.50	90.16
Feb. 1-10	24.50	16.80	17.50	182.50	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	42.00	50.50	90.16
Jan. 29-31	24.50	16.80	17.50	188.00	19.00	42.00	50.50	90.16
Jan. 26-27	24.50	16.80	17.50	182.00	19.00	42.00	50.50	90.16
Jan. 25	24.50	16.80	17.50	183.00	19.00	42.00	50.50	90.16
Jan. 24	24.50	16.80	17.50	180.00	19.00	42.00	50.50	90.16
Jan. 23	24.50	16.80	17.50	178.00	19.00	42.00	50.50	90.16
Jan. 22	24.50	16.80	17.50	176.00	19.00	42.00	50.50	90.16
Jan. 19-20	24.50	16.80	17.50	175.50	19.00	32.00	50.50	90.16

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, effective Feb. 7, 1951.

STEELMAKING SCRAP COMPOSITE

Mar. 1	$44.00
Feb. 22	44.00
Feb. 1951	44.00
Mar. 1950	28.23
Mar. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade 1)

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	40.00	42.00
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 heavy melting steel) for other grades of dealer and industrial scrap.

Open-hearth and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Electric Furnace and Foundry Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate Scrap	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
20. Foundry Steel, 2 feet and under	+ 2.00
21. Foundry Steel, 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11, 23 and 24 may be charged only when shipped to a consumer directly from an industrial producer of such grades; otherwise ceiling prices shall not exceed prices established for the corresponding grades of basic open-hearth and blast furnace scrap.
(2) Prices established for Grades 26 and 27 may be charged only when such grades are sold for use for chemical or annealing purposes; otherwise ceiling prices for such grades shall not exceed the price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price for such grade shall not exceed the ceiling price established for the corresponding grade of basic open-hearth.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $4; 75% and over, $6; less than 75%, $10.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel	— 6.00
9. Uncut Frogs, switches,	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
22. Uncut Bolsters & Side Frames	Base
23. Cut Bolsters & Side Frames	+ 3.00
24. Angle & Splice Bars	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling price for such grade shall not exceed ceiling price established for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling price for such grade shall not exceed ceiling price established for No. 1 heavy melting steel.

CAST IRON SCRAP

Ceiling price per gross ton for any of the following grades of cast iron scrap shall be the price shown in the following table, f.o.b. shipping point.

1. Cast Iron, No. 1 (Cupola Cast)	$49.00
2. Cast Iron, No. 2 (Charging Box Cast)	47.00
3. Cast Iron, No. 3 (Heavy Breakable Cast)	45.00
4. Cast Iron, No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery Cast	52.00

Restrictions on Use

(1) Ceiling shipping point or on-line price which a basic open-hearth consumer may pay for No. 1 cast iron, No. 1 wheels, clean auto cast or malleable shall be the ceiling price established for No. 3 cast iron.
(2) Ceiling shipping point or on-line price which any foundry consumer other than a malleable iron producer may pay for Grade 10 shall be the ceiling price established for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin which is allocated by the National Production Authority to a consumer, shall be as follows:
(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grade No. 12, Grade No. 13, Grade No. 14, or Grade No. 18, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $10.
(8) For preparing into Grade No. 16 or Grade No. 20, $10.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be as follows:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron shall be limited to the following:
(1) For preparing Grade No. 8 into Grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and the consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless the consumer obtains prior written approval from OPS.

No preparation charge other than the charges set forth above may be made for the preparation of any grade of iron or steel scrap unless the consumer has secured prior written approval of such charges from OPS.

Commissions

No commissions shall be payable except by a consumer to a broker for brokerage services rendered. Where scrap is allocated by NPA other than from a governmental agency, the seller may designate a broker. Where scrap is allocated by NPA from a governmental agency, the consumer may designate a broker. In the event a broker purchases scrap for sale to a consumer, such consumer may pay such broker a commission not exceeding $ a ton.

Unprepared Scrap

The term "unprepared scrap" shall not include such demolition projects as bridges, box cars or automobiles which must be so priced that the prepared scrap will be delivered to the consumer within the established ceiling delivered prices.

For unprepared steel scrap other than materials suitable for hydraulic compression, the ceiling basing point prices shall be $8 per gross ton beneath the established ceiling price of the prepared base grades, No. 1 heavy melting or No. 1 railroad heavy melting steel.

For unprepared material which when compressed constitutes No. 1 bundles the ceiling basing point price shall be $6 per gross ton beneath the ceiling basing point price for No. 1 bundles; or when compressed constitutes No. 2 bundles the ceiling basing point price shall be $8 per ton beneath the ceiling basing point price for No. 2 bundles.

Any iron casting which cannot be broken with an ordinary drop into Grade No. 2 or Grade No. 1 may not be classified as Grade No. 3. Where such iron casting requiring blasting or other special preparation is sold to a consumer of scrap, the shipping point price for Grade No. 3 must be reduced by the amount of the additional charges required for preparation.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace use or on NPA allocation); $1 for scrap conforming to SAE 52100 when sold for electric furnace use only.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 33c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34c; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Los Angeles (including Firestone switching district), 66c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 70c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

Sheets, Strip . . .

Sheet and Strip Prices, Page 153 & 154

New York—Promises on DO-rated orders for hot carbon sheets range from May through July. On cold-rolled carbon most mills can take some DO-rated tonnage for May. Interestingly, one large producer can accept cold-rolled for May shipment on such ratings but can do nothing on hot sheets before July. Promises on some specialties are fairly extended. One large mill is booked up on long ternes until August and on silicon sheets to July. Another producer of silicon sheets is promising June on cold-reduced and July on hot-rolled. DO-rated orders for stainless sheets can be handled by various producers for May and June delivery.

Philadelphia—Reports are current heavier minimum quotas will be set up at the mills for DO-rated orders for sheets, as well as certain other major products. Some producers claim it will not make much difference in schedules as they are already supplying more steel for emergency purposes than they are compelled to under existing quotas.

Boston — Defense order backlogs are mounting while allocations to nonrated consumers shrink. Suppliers are booked over acceptance limits on numerous flat-rolled products for June and July and a place must be found for considerable volume already booked via current system under CMP, expected about July 1.

Pittsburgh—Rising volume of light plate demand is cutting increasingly into supplies of sheets for the civilian goods market. Plate allocations are taking up more rolling time on continuous mills at the expense of sheet output. This, along with the fact sheet allocations for DO and other national emergency requirements are taking a larger share of output, is resulting in steady tightening in supplies.

Whether the cutback in supplies to certain large consumer durable goods lines, proposed for second quarter, will materially improve overall supply conditions in the light, flat-rolled products remains to be seen. Some producers doubt it will result in any noticeable change with released tonnage being immediately absorbed on emergency account.

The mills point out that the increase in DO set-aside tonnage on hot-rolled sheets to 17 per cent of mill output in first half of 1950 actually works out to much larger proportion of current sheet production. This is explained by the fact sheet rolling time is substantially reduced currently as against a year ago by diversion of facilities to production of light plates. A year ago the continuous mills were engaged virtually 100 per cent on producing sheets. Consequently, the current 17 per cent set-aside on hot-rolled sheets represents a much larger percentage of current sheet production. One large mill here estimates the set-aside actually comes closer to 30 per cent.

Cleveland—Extent to which sheet output will be cut down by the diversion of rolling facilities to production of light plates remains to be determined. But with a shipbuilding and ship repair program in the works expectations are plate rolling time on many of the continuous mills will be substantially upped before many months pass. Cutbacks in sheet supplies to civilian goods manufacturers, such as the automobile builders and appliance makers, will offset only to slight degree the loss in sheet tonnage to plates unless the cutbacks are increased beyond presently projected limits of 20 per cent for the second quarter and 30 per cent for third quarter.

St. Louis—Mutterings are heard among nonrated consumers of cold-rolled sheets who are beginning to feel the still-limited transition of sheet capacity to plates. Plate producers last week were predicting further cuts until the sheet-plate balance is better worked out. In this midcontinent area, with few local suppliers, it appears there may be temporary periods of excess as well as extreme tightness in some items.

Birmingham—Steel mill interests anticipate no relief in the matter of sheets because of cutbacks in civilian goods now scheduled for April.

Steel Bars . . .

Bar Prices, Page 153

Chicago—Hot-rolled rods and cold-finished bars are among products for which DO demand exceeds ability of bar producers to accommodate in the months the material is required. Overall demand for both carbon and alloy bars far exceeds monthly production and consumers are being progressively squeezed with declining quotas from mills. Effects of the recent railroad strike are not yet obliterated and barmakers are using truck shipment to the maximum to speed and augment deliveries.

Boston—Hot-rolled alloy bar allocations to nondefense consumers will be eliminated for May by one leading producer. Other producers will reduce substantially civilian tonnage of alloy and carbon bars, notably high-carbon, hot-topped quality. Some rated volume has been moved forward to April from May, as a result of increase in DO acceptance limitations. Despite this, placement of rated orders has moved DO schedules to May on hot-rolled carbon and to June for alloys. Bookings of cold-rolled extend far beyond expected operation of CMP in some cases with outlook dim for civilian tonnage through expected adjustment in distribution from July on.

New York—Bar producers' promises on DO-rated orders vary. In some cases, producers have been taking more than minimum quotas, as set up by the government, and then, too, there is a variation in availability of different sizes and forms of bars as offered by individual mills. One large producer is booked into June on hot carbon bars and into June on cold finished carbon; into May on hot alloy bars and into June and July on cold finished alloy bars. Another large interest is booked through August on shell steel and in general through May on the smaller sizes in rounds, squares and flats; also on bar shapes. On hot alloy open hearth grades this interest can take nothing in the way of DO-rated orders before May and on hot alloy electric furnace grades, nothing before July.

Philadelphia—Non-rated consumers of hot carbon bars expect a sharp cut in mill allocations for May, when schedules for that month are set up within the next two weeks. In addition to the new allocation programs there may be a still larger minimum quota established for May on DO-rated orders.

Pittsburgh—Increasing demand from military and other national emergency requirements is crowding the bar mills steadily. Some sellers maintain bar supply conditions are tighter than in the light, flat-rolled items, perennially in shortest supply. Stepup in DO set-asides to 15 per cent from 10 on hot-rolled bars, to 25 per cent from 15 on cold-finished, and to 45 from 35 on alloy bars will be felt sharply in some consuming directions beginning in April. Furthermore, producers anticipate still further increase in the percentage set-asides before end of second quarter. Some of them anticipate a highly confused market situation unless some form of the Controlled Materials Plan is put into effect quickly to more closely co-ordinate demand with available supply.

Cleveland—Merchant bar sellers are doing their best to allocate available tonnage to customers as equitably as possible but they are meeting increasing difficulty satisfying requirements of the regular trade with DO and other defense tonnage constantly rising. Regular commercial bookings extend only through April, producers strictly adhering to the policy of booking such business on a month-to-month basis as against quarterly bookings formerly. On DO account, however, certain mills are sold into the late summer.

Seattle — Demand for reinforcing and merchant bars continues to crowd rolling mills, which already have heavy backlogs. Many sizable contracts are set for the near future, most of them public works. Alaskan military projects are calling for major quantities.

Plates . . .

Plate Prices, Page 153

Pittsburgh—Plate producers anticipate gradual increase in demand for ship construction and repairs over coming months. Allocations are being set up for May which include substantial plate tonnage for merchant ships and ship repairs. In addition allotments for Canadian and domestic lake ore carriers will take substantial monthly tonnage. The freight car program, it is understood, beginning in May will call for only 9000 cars monthly as against 10,000 up to now. However, the reduction in the steel allocation will run only slightly over 10,000 tons monthly since, it is understood, production of cars will be concentrated, at least for a time, on the heavier type units.

Boston—Worth Steel Division, Colorado Fuel & Iron Corp., will supply welded steel pipe for a natural gas line in New England for Algonquin Gas Transmission Co. Deliveries start in August on an estimated 55,000 tons, 26 and 24-in. pipe. Laterals will require 280 additional miles in smaller sizes. Northeastern Gas Transmission Co., also supplying gas to part of New England, has applied for larger capacity main line pipe. Total lateral requirements by utilities are

around 35,000 tons. Plate allocations for May will be reduced sharply to unrated consumers.

New York—While an increasing amount of strip plate is being produced, sellers of this product almost without exception are confining this business to rated orders and indicate that as soon as the stringency is over they will go right back to production of the lighter gage material.

Tonnage for ordinary civilian needs is steadily shrinking. In most cases April allotments are down from March, and May allotments will be definitely down from April, due in part to the new allocation programs which have been set up for that period for defense work.

Chicago—Unbalanced inventories constitute the major problem faced by the plate fabricating industry currently. Jobs are tied up because steel of specific thicknesses and sizes is not at hand when needed.

Birmingham—Plates are more difficult to buy. Biggest penalty being paid by the district for lack of both plates and sheets is losing of contemplated expansion by established industry and the impossible situation facing new plants which have been holding off after indicating interest in the district.

Los Angeles—Fabricators, with plate stocks down 50 per cent from mid-1950 level, grab at offers of premium steel for stop-gap supplies.

Seattle—Small plate shops are practically out of inventory and are hoping for DO contracts to enable them to continue in business.

Wire . . .

Wire Prices, Page 155

Cleveland—Demand pressure on the wiremakers mounts in step with expanding defense activities. Increasing tonnage is being diverted from regular civilian goods channels. Some durable consumer goods makers have been compelled to curtail operations. Nonintegrated wiremakers are meeting increasing difficulty maintaining production schedules in the face of rod shortages. In certain instances operations are on a virtual day-to-day basis keyed to receipt of steel from the larger mills. American Steel & Wire Co.'s local mills are having operating difficulties because of short billet supplies arising from the recent switchmen's strike which seriously cut down shipments from its supplying plants at Lorain, O., and in the Pittsburgh district.

Chicago—Available wire tonnage is inadequate to meet needs and consumers' inventories are at uncomfortably low levels. Furniture makers, for example, are able to obtain only 60 per cent of the coil springs obtainable last fall. Wiremakers are entering wire rope orders in peak volume, customers apparently seeking to cover needs well in advance. This is true despite the fact current inventories generally are adequate. Oil drilling activity accounts for a substantial portion of buying.

Birmingham—Wire consumers are feeling the effects of rationing. Wire supplies have been tight here for a long time, but the new order of things is aggravating that situation. Some slowing down on the part of users of manufacturers' wire is reported.

Structural Shapes . . .

Structural Shape Prices, Page 153

Boston—With few exceptions structural fabricating shops are operating close to plain material supply. Some projects under contract are averaging one month behind schedule. This is due largely to lack of relatively small tonnage or parts for maintenance of schedules.

Philadelphia—Structural inquiry is off appreciably. Only a few fair sized projects are up for figuring and little new work is in immediate prospect, although plans for considerable industrial construction are in tentative stage.

Chicago—Structural fabricators are booked through third quarter, in a few instances commitments extending well into 1952. Faced with the increasing difficulty of obtaining steel, they are displaying little interest in new projects unless they carry DO or support program ratings. Despite the fact a major portion of structural steel and plates produced today goes to civilian use, demand far exceeds the supply.

San Francisco—Lifting of the government's ban on commercial building in favor of a certification plan has resulted in heavy filings with the regional offices of the National Production Authority. Some fairly substantial ones have been approved, all of which will add up to additional demand on an already overburdened structural shape market.

Seattle—Fabricating plants are heavily booked. Small contracts continue to be taken in spite of increasing material shortages. Demand during the next six months likely will be of record proportions. Major tonnages are involved in Army projects in Oregon, Washington and Alaska.

Tin Plate . . .

Tin Plate Prices, Page 154

Pittsburgh—Faced with reduced tin allocations for second quarter tin plate producers are uncertain just what steps to take to satisfy customers' requirements. Lighter coatings will solve the problem to only a limited extent, the cut in tin supply being too sharp to be completely offset by such.

The government control authorities are learning that substitutes are not easily found. At any rate NPA has found it advisable to amend its order M-25 regulating use of tin in cans, the amended order now permitting packing of some products in tin contaners prevously banned.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 153

Boston—To place 500 tons for a warehouse and manufacturing building, a Springfield, Mass., contractor bought from six fabricators and distributors; largest tonnage available from any one was 227 tons. While inquiry for concrete reinforcing bars is lower, allocations to distributors also are shrinking. Result is no easing in availability of bars; same holds for piling and mat reinforcement.

Chicago—Demand for reinforcing steel exceeds supply so far that only a fraction of work offered attracts bidding. Contractors figuring the projects are required to do considerable personal soicitation among suppliers, frequently without success. Schools in particular are finding rough going. Commanding more favorable attention are jobs related to the defense program.

Tubular Goods . . .

Tubular Goods Prices, Page 157

Cleveland—Pipe production is back to normal at the Lorain, O., works of National Tube Co. following the shutdown occasioned during the recent switchmen's strike. Shipments again are moving out of the plant on schedule. Pipemakers are booked months into the future and there is no prospect of any change in supply conditions for a long time to come with demand pressure continuing from all directions. Republic Steel Corp., Cleveland, last week announced plans for installation of a seamless tube mill of more than 150,000 tons annual capacity at South Chicago to be ready for production by April, 1952.

Boston—Allocation of 8500 tons six-inch steel pipe line, Searsport to Limestone, Me., probably will be made to several mills. No one producer is in a position to ship total tonnage for wanted delivery. To considerable extent this also will apply to lateral lines for natural gas distribution; a large tonnage will close in fall.

Pittsburgh—Those mills that had been affected by the recent switchmen's strike are pretty much back to normal so far as shipping is concerned. Car supply is noticeably improved though some difficulties on this score still are encountered. The pressure of demand continues to mount with consumers flooding the mills with tonnage requests that cannot possibly be considered for months.

Seattle—Agencies of eastern and southern cast iron pipe producers find competition increasingly keen. Other types of pipe are being purchased due to quicker delivery.

Warehouse . . .

Warehouse Prices, Page 159

Philadelphia—Most warehouses report a slight falling off in daily business last month. Somewhat contrary to the over-all picture in stainless sheets as reported by some leading producers, local distributors say they can move the heavier gages of stainless faster than the lighter.

Pittsburgh—Movement of tonnage from warehouse is maintained at levels that compare well with those of recent months. February shipments are estimated at least equal to those in the preceding month. Volume would have been greater, some distributors hold, had stocks been balanced and equal to demand. Mill shipments have been coming in steadily but the total tonnage received falls below warehouse needs.

Seattle—Wholesalers face a difficult situation. Supplies are so short that delivery on DO contracts is delayed. Mills are slow in shipping orders placed months ago. Warehouse inventories are extremely low, while demand continues strong.

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Iron Ore . . .

Iron Ore Prices, Page 159

Pittsburgh—Indications are blast furnaces in this area will have sufficient ore supply to support capacity operations until opening of navigation on the lakes. At any rate, furnace operators express no immediate concern, though, admittedly, concern would rise should navigation opening be delayed as it was a year ago. The U.S. Steel Corp. has maintained ore shipments into this area, Youngstown and Chicago through the winter by rail from the head of the lakes. Something like 1 million tons were brought down all-rail as a safety measure involving use of special steaming equipment in unloading cars at furnaces.

Pig Iron . . .

Pig Iron Prices, Page 152

New York—Stringency in pig iron is increasing. Domestic supply is well short of demand and it is increasingly difficult for consumers to place foreign orders for delivery within the next few months. Some large importers have nothing to offer before early fall. A fair amount of foreign tonnage is arriving against old orders, but not very much for this district, as consumers here were slow in turning to foreign iron. Another factor in the current squeeze is the increasing shortage of scrap.

Boston—Whether or not Everett pig iron prices will be frozen at current prices for the second quarter is a matter to be determined shortly. Bulk of foundries in New England have a mutual agreement contract by which quarterly prices are determined by furnace costs. These are higher and, if prices are frozen, price clauses in these contracts would in effect be void.

Buffalo—Merchant pig iron sellers report difficulty filling demands but no foundries have been forced to curtail operations as yet. The bulk of the melt is still going into civilian production, but the volume of government contracts is on the upgrade. Coke supply is tight and the foundries are also finding it difficult to obtain cast scrap.

Philadelphia—Pig iron supply is shrinking, and while no program of government allocation is reported in early prospect, some informal relief has been provided upon occasion through co-operation of producers with government officials, it is understood. Foreign shipments are helping to some extent, although it is difficult to place new tonnage abroad except for extended delivery.

Pittsburgh—The 30-day limitation on pig iron inventories is holding back some demand from foundries which otherwise would be flooding producers. To that extent, the government regulation has eased the strain on supply. Overall conditions, however, continue unsatisfactory since demand is in excess of production and there is no prospect for any improvement soon. In fact, with demand for castings rising, supply conditions promise to steadily worsen in the merchant iron market.

Cleveland—Merchant pig iron sellers are under constantly mounting pressure from the foundries for iron despite the 30-day inventory limitation imposed by the National Production Authority some time ago. The simple fact is few foundries have been able to accumulate large iron inventories for a long time past so that the limitation order means little. Sellers are allocating output to customers on the basis of past sales, giving priority to defense requirements. Tonnage demand on the latter account is rising but still represents but a relatively small proportion of the total merchant iron moving. Jones & Laughlin Steel Corp. last week blew out one of its two stacks here for repairs, leaving 8 stacks in blast out of 9 in the immediate Cleveland district. The J. & L. stack will be down for at least four weeks.

Cincinnati—Melt was resumed after one week to 10 days in 26 foundries in this area, a strike of molders over a wage dispute having ended. Shutdowns were too brief to make much change in pig iron stocks. Shipments are more regular but holding to the tonnage level of January in both northern and southern iron.

Chicago—Since pig iron is allocated to foundries on a monthly basis, February threw a monkeywrench in the gears because it was a short production month. In some cases quotas could not be filled. Melts of foundries are regulated by the availability of iron, scrap and fuel, all troublesome supply factors at present. Considerable foreign iron is barged up the Mississippi river into this district and to some extent easing the shortage of metallics.

Birmingham—Every pig iron consumer dependent upon the district has exceptionally light inventories. Some pig iron users are on a day-to-day basis, and some cutbacks in operating schedules are noted.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 157

Cleveland—Tight oven coke supply conditions in this general area will be intensified by the closing down for repairs of the Perry ovens at Erie, Pa., of Interlake Iron Corp. Expectations are these ovens will be out of production several months. There are 72 Wilputte ovens at the works with annual capacity of 275,600 net tons. Shutting off of supplies from these ovens to the merchant trade will force increased dependence on beehive coke.

Pittsburgh—Coke sellers still are awaiting action by the government economic stabilization authorities on their request for permission to advance prices in line with the recent increase allowed on coal. Failure of the stabilization agency to act on the matter caused coke interests to delay invoicing against sales as long as possible. Now, however, some sellers are invoicing at the January prices subject to revision upward depending on action by the stabilization agency.

Chicago—Suppliers of coke are swamped with calls from foundries pressing for shipments. Quotas are on a monthly basis and because February was a short month oven production was below average.

Scrap . . .

Scrap Prices, Page 164

Pittsburgh—High-level steel mill and foundry operations are taking toll of scrap stockpiles steadily. Ordinarily the mills carry around 60 days inventory but it is estimated their stocks today, on the outside, do not exceed 35 days, and in many instances fall considerably under that mark, chiefly with respect to certain specialty grades. Trading is sluggish in the local market. Consumers are taking in tonnage right along but dealers are not pressing material on the market. Expectations are trading will pick up noticeably within 60 days with more spirited collections accompanying return of more favorable weather. Some dealers' yards outside this immediate consuming district are reported holding substantial accumulations part of which may move to mills here over the next few weeks.

Philadelphia—Stringency in scrap is acute. Various mills are operating on a hand-to-mouth basis, and in some cases are being given relief through government allocations, most of which involve railroad scrap, although some industrial scrap is being allocated as well.

Government has ruled open hearth and blast furnace operators can no longer raid the market for electric furnace and foundry scrap, the latest order affecting grades 20 and 21 for which these consumers have been paying premiums up to $6 a ton. Further regulations may be necessary to eliminate upgrading. Some trade leaders believe all four leading grades of open hearth scrap should be placed on a single price basis, as was done in World War II. Also they believe that such action will have to be taken in cast scrap. Due to upgrading the price ceiling has become the floor on some items.

Cleveland—Provisions of the scrap price order are working out to a distinct disadvantage to foundries here. Receipts have declined in volume and much of what they are receiving originates at distant points, forcing them to absorb as much as $10 a ton freight charges. Due to the shortage of material, some are forced to absorb higher costs arising from upgrading. One foundry, for instance, paid $52 a ton for stove plate (ceiling $46) which was shipped on an order calling for drop broken machinery cast. Dealers and brokers expect a pickup in activity by Apr. 1.

Detroit—Scrap generated in this area is being sold on the basis of $40.20 for No. 1 heavy melting, 20 cents above the base established for Detroit. This price is arrived at by deducting the dockage charge and the boat rate to Cleveland from the Cleveland base price of $43. Traditional practice of bidding for automotive scrap has completely disappeared, generators now dictating which mills will receive their materials. A full-fledged allocation system is expected about Apr. 1.

Chicago—Flow of scrap has not kept pace with improvement in weather conditions and has served to confirm the opinion of brokers that a shortage exists. Industrial material is moving in good volume but dealer acquisitions are below normal. Sources in the rural areas are drying

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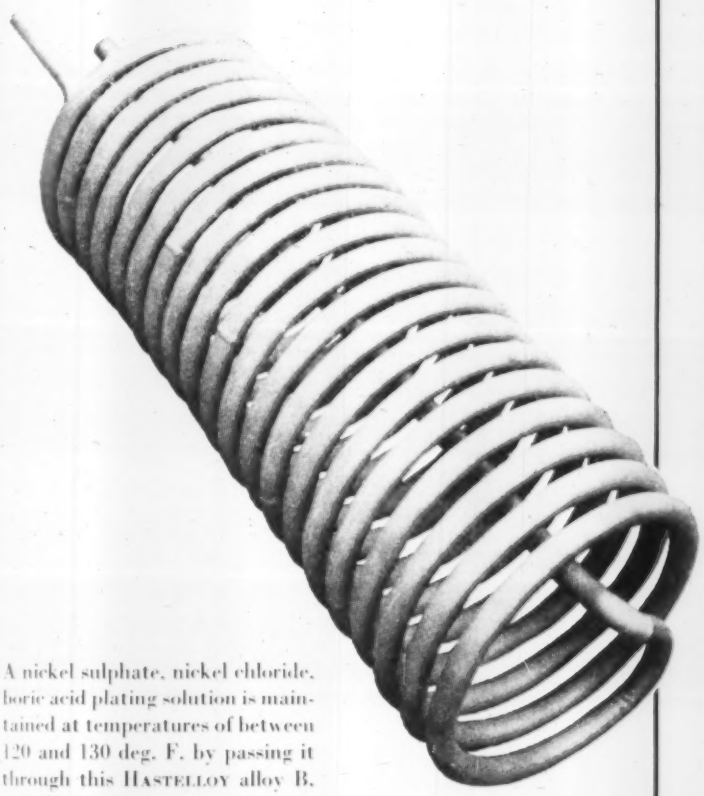

A nickel sulphate, nickel chloride, boric acid plating solution is maintained at temperatures of between 120 and 130 deg. F. by passing it through this HASTELLOY alloy B. coil. The coil is heated on the outside by live steam under a 30 lb. pressure.

Used as a heat exchanger in a system designed to heat and cool nickel plating solutions, this HASTELLOY alloy B coil shows no sign of wear after one year's service. In operation the plating solution is on the inside of the coil and either live steam or cooling water are used on the outside to control the temperature of the solution at approximately 130 deg. F. The lead coils previously used had to be replaced every 3 months.

Alloy B was unusually successful here because it has high tensile strength and excellent thermal shock characteristics in addition to superior corrosion resistance. This combination of properties permitted the fabrication of the coil with walls that are thin enough to insure good heat transfer and, at the same time, strong enough to stand up under the impact of water hammer and the shock of sudden temperature changes.

There are four grades of HASTELLOY alloy, each designed to resist certain types of corrosive media. All four grades have excellent physical and mechanical properties. Fill out and mail the coupon below for complete information on these alloys. The 40 page booklet, "HASTELLOY Nickel-Base Alloys," describes them in detail.

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up. With steel plants and foundries operating close to capacity the deficiency snowballs and already is giving rise to speculation as to how soon some system of allocations will be necessary.

Cincinnati—A genuine shortage of cast scrap is imminent according to foundries. Some buyers are virtually on a day-to-day supply basis. Mills are considerably off on open hearth grades partly due to heavy intake before price ceilings.

Boston—No. 1 heavy melting steel scrap is scarce. Shortage of cars is restricting movement. Punchings and plate scrap, also electric furnace bundles, are slightly more active. No. 1 steel commands $34.17, f.o.b. at most points for rail shipment. Barge rate shipment prices are uncertain, but $37.00, New Haven, has been done. At Providence, $36.30 is likely to be confirmed.

New York—Scrap brokers claim they have 10 buyers for every ton of steel scrap. They see little prospect of early improvement in supply and believe the time is not far off when steel operations are going to be adversely affected. Cast supply is tight.

Buffalo—Failure of scrap collections to improve is causing concern among mills. All three major consumers are depending upon reserve supplies to hold output at capacity. Lack of current receipts is attributed to the heavy movement of material prior to price controls.

St. Louis—Scrap shipments are up moderately with improved weather but no big orders are being placed. Mill inventories are fair, around 45 days. Dealers are not eager to take on big orders. This wait-and-see standoff suggests the scrap trade may be for some time on the basis of small and more frequent orders.

Birmingham—Local and regional scrap consumers have re-entered the market in considerable volume.

San Francisco—Producers as well as users of steel are asking the same question: Where can we get the raw materials to continue to operate at capacity? One of the major mills' supplies of scrap are down to about half of what they were a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1400 tons, towers for naval communications center, Snohomish county, Washington, to Flint Steel Corp., Tulsa, Okla.; Morrison-Knudsen Co. and City Electric Co., Seattle, joint low $1,088,605.

900 tons, power station, unit No. 3, Kentucky Utilities Co., Tyrone, Ky., to Steel Construction Co., Birmingham, Ala.; Sargent & Lundy, Chicago, engineers.

790 tons, drill hall, Northwestern University, Evanston, Ill., to American Bridge Co., Pittsburgh.

500 tons or more, shapes and bars, woolen mill, Deering, Milliken & Co., Columbus, N. C., to Belmont Iron Works, Philadelphia, and Ceco Steel Products Co., New York; Daniel Construction Co., Greenville, S. C., general contractor.

300 tons, bridge superstructure, Aroostook county, Maine, to American Bridge Co., Pittsburgh; bids on steel direct.

175 tons, public school, Concrete, Wash., hangar expansion Bellevue, Wash. and other miscellaneous projects, to Leckenby Structural Steel Co., Seattle.

145 tons, shapes and bar joists, addition, junior high school, Swansea, Mass., to Tower Iron Works, Providence, R. I., and 62 tons to Truscon Steel Co., Boston; Plantation Steel Co., Providence, reinforcing; Dimeo Construction Co., Providence, general contractor.

130 tons, bridge work for Reading Co., Western, N. J., to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

5000 tons, state bridge, Jacksonville, Fla.; bids Mar. 20.

2000 tons, nurses home, Bellevue Hospital, Municipal Department of Hospitals, New York; pending.

800 tons, residence hall for men, University of Illinois, Medical Center, Chicago; bids Mar. 5.

800 tons, Army warehouses, Fort Richardson, Alaska; bids to U. S. Engineer, Seattle, Feb. 28.

500 tons, estimated, submarine propulsion test facilities, Annapolis, Md.; bids Mar. 15.

350 tons, (also 100 tons reinforcing) Washington state bridge, Lewis county, general contract to Anderson Bridge Co., Tacoma.

200 tons, ordnance vehicle structure, Alaska; bids to U. S. Engineer, Seattle, Feb. 28.

125 tons, (including reinforcing) Washington state railroad undercrossing, Stevens county, general contract to Charles A. Power, Spokane, low, $138,145.

Unstated, hot semi-works and other structures, Hanford works, to L. H. Hoffman, Portland, Oreg., $2,473,000, by General Electric Co., prime contractor for Atomic Energy Commission.

Unstated, rebuilding Hanford substation; general contract to Montgomery Electric Co., Seattle.

Unstated, steel frame warehouse, McNary dam, bids to U. S. Engineer, Walla Walla, Wash., Mar. 7. First bids received Jan. 31 rejected.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2000 tons, addition to original contract for McNary dam, to Northwest Steel Rolling Mills Inc., Seattle.

1245 tons, regional office and clinic building No. 11, Veterans Administration, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Gust K. Newberg Construction Co., Chicago, contractor.

1000 tons, apartment building, 11820 Edgewater Dr., Lakewood, O., to Builders Structural Steel Corp., Cleveland.

700 tons, hotel, Lexington, Ky., to Pollak Steel Co., Cincinnati.

500 tons, warehouse and manufacturing building, Stanley Home Products Inc., Easthampton, Mass., 227 tons to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; 100 tons Concrete Steel Co., Boston; balance to miscellaneous distributors; Ernest F. Carlson Inc., Springfield, Mass., general contractor.

350 tons, Army housing, Elmenford Field, Alaska, to Northwest Steel Rolling Mills Inc., Seattle.

250 tons, warehouse, United States Rubber Co., Detroit, to United States Steel Supply Co., Chicago.

200 tons, Washington state highway job and Navy installation, Whidby Island, Washington, to Bethlehem Pacific Coast Steel Corp., Seattle.

150 tons, highway project No. 522, Cuyahoga Falls, O., to United States Steel Supply Co., Chicago.

100 tons, school, Merrimac, Mass., to United States Steel Supply Co., Boston; J. F. Rand & Son, Boston, general contractor.

REINFORCING BARS PENDING

2000 tons, water softening and filtration plant, Dayton, O.; bids in.

1515 tons, column footings, Charlestown sections elevated highway structure, Central Artery, Boston; bids Mar. 20; also 25,550 linear feet steel piles, furnished by state.

305 tons, steel joist, Elgin National Watch Co., Lincoln, Nebr.

150 tons, highway project No. 9, Summit county, Ohio.

Unstated, grade school, Lamon avenue, Chicago.

Unstated, $6 million Army housing, service and recreation buildings, Whittier, Alaska; bids to U. S. Engineer, Seattle, Mar. 27.

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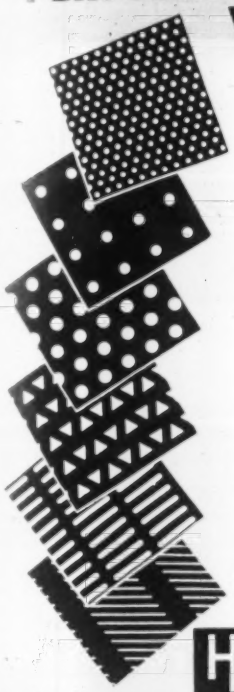

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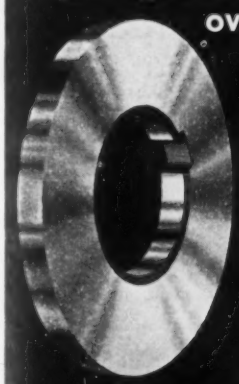

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CHEMICALS ACP PROCESSES

PHOSPHATIZING, RUST PROOFING AND PAINT BONDING CHEMICALS

Specification Number	ACP Specification Chemical
QQ-P-416	"Lithoform" "Zinodine"
RR-C-82	"Lithoform" No. 32
MIL-C-5541 (See also QPL-5541-1)	"Alodine"
MIL-S-5002	"Alodine" "Granodine"
JAN-C-490, Grade I	"Granodine"
JAN-F-495	"Granodine" "Lithoform"
JAN-L-548	"Permadine"
AN-E-19	"Alodine" "Zinodine"
AN-F-20	"Alodine" "Granodine" "Lithoform" "Permadine" Thermoil-Granodine" "Zinodine" (See also U. S. A. 3-213)
U. S. A. 57-0-2 Type II, Class A Type II, Class B Type II, Class C	Thermoil-Granodine" "Permadine" "Granodine"
U. S. A. 51-70-1 Finish 22.02, Class A Finish 22.02, Class B Finish 22.02, Class C	Thermoil-Granodine" "Permadine" "Granodine"
U. S. A. 50-60-1	"Granodine"
U. S. Navord O. S. 675	"Alodine"
U. S. N. Appendix 6	"Lithoform"
Navy Aeronautical M-364	"Permadine" Thermoil-Granodine"
16E4 (Ships)	"Alodine" "Granodine" "Zinodine"
AN-C-170	(See MIL-C-5541)
U. S. A. 72-53	(See AN-F-20)
AXS-1245	(See JAN-C-490)

RUST REMOVING AND METAL CONDITIONING CHEMICALS

Specification Number	ACP Specification Chemical
JAN-C-490, Grade II	
Type 4	"Deoxidine" Nos. 126, 512, 526, 624, 670
Type 5	"Deoxidine" Nos. 170, 171, 670
MIL-C-10578	
Type I	"Deoxidine" (Wash-off)
Type II	"Deoxidine" (Wipe-off)
U. S. A. 98-20007	"Deoxidine" No. 424
U. S. N. Appendix 6	"Deoxidine"
U. S. A. 3-213	(See MIL-C-10578)

METAL CLEANING CHEMICALS

Specification Number	ACP Specification Chemical
JAN-C-490 Grade II	
Type 2	"Ridoline"
Type 6	"Ridosol"
U. S. A. 3-192	"Ridoline" No. 3192

ACID INHIBITORS, PICKLING

Specification Number	ACP Specification Chemical
U. S. N. 51-1-2	"Ridine"

Additional copies of this chart and descriptive folders on the ACP Specification Chemicals listed above are available on request.

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PLATES . . .

PLATES PENDING

5000 tons, Seattle Bow Lake pipe line; bids opening postponed from Feb. 28 to Mar. 14.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, 8 inch, for Seattle; awarded to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

300 tons, 10 to 16 inch, Metropolitan District Commission, Hartford, Conn.; bids Mar. 8, Hartford, Water Division.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Rutland, five 1600-hp diesel-electric road-switching units, to American Locomotive-General Electric Companies, Schenectady, N. Y.

LOCOMOTIVES PENDING

Louisville & Nashville, 67 diesel-electric units, purchase authorized; list comprises forty-seven 1500-hp freight, ten 1500-hp passenger and ten 1200-hp switching units.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 500 seventy-ton gondola cars, to own shops.

Atlanta & West Point, 90 fifty-ton box cars, to Pullman-Standard Car Mfg. Co.

Cambria & Indiana, 400 fifty-ton hopper cars, to Bethlehem Steel Co.

Chattahoochee Valley, ten 50-ton pulp wood cars to own shops.

Chesapeake & Ohio, 200 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co.'s Butler, Pa., shops. An identical order was placed by C. & O. with Pullman early in February.

Chicago & Illinois Midland, 150 seventy-ton gondola cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago & Eastern Illinois, 100 fifty-ton box cars to American Car & Foundry Co., New York.

Duluth, Missabe & Iron Range, 1500 seventy-ton ore cars, to Pullman-Standard Car Mfg. Co., Chicago.

Georgia, 110 fifty-ton box cars and 100 fifty-ton hopper cars to Pullman-Standard Car Mfg. Co., Chicago.

Merchants Despatch Transportation Corp., 1000 forty-ton refrigerator cars, to own shops in East Rochester, N. Y.

Richmond, Fredericksburg & Potomac, 100 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Western of Alabama, 50 fifty-ton gondola cars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Northern Pacific, 250 seventy-ton gondola cars; bids asked.

FERROALLOYS

(*Continued from page 159*)

4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr. 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N.; add 5c for each 0.25% of N above 0.75%.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk 23.25c per lb of contained Cr, c.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract Carload, packed, S MxD, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $3.25 per lb of contained W 2000 lb W to 10,000 lb W, $3.25; less than 2000 lb W, $3.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.) Contract or spot, 1000 lb or more, $4.15 per lb of contained W; less than 1000 lb W, $4.25.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.5c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 15.55c per lb of contained Si, carload packed 16.8c, ton lot 17.8c, less ton 18.95c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton lot 16.0c, less ton 16.9c. Delivered. Add 0.25 for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si) Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.55c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-42%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $3.10 per lb of contained Va. Delivered, Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 36-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, delivered; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24%, P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., 95.00c.

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Arizona

Cleco Division, **Reed Roller Bit Co.,** Houston, appointed Equipment Sales Co., Phoenix, Ariz., as distributor of Cleco pneumatic tools in that area.

California

Rich Steel Pickling Co., Los Angeles, is opening a job pickling plant in that city. Tanks will have a capacity to process material up to 30 feet long and 6 feet wide.

California

Robertshaw-Fulton Controls Co., Youngwood, Pa., is constructing an office building and manufacturing plant near Anaheim, Calif. Completion is scheduled within three and one-half months. Cost is estimated at $425,000 for the buildings and $500,000 to $600,000 for machinery and equipment. The plant will turn out automatic controls, but initially the company may be forced to devote the capacity of the plant to the manufacture of military items, such as aircraft instruments and components.

California

Ducommun Metals & Supply Co., Los Angeles, is building an addition to its warehouse.

California

Construction of the world's largest underground garage is under way in the heart of downtown Los Angeles. The $5 million structure will double as a bomb shelter. Completion is scheduled by February, 1952. General contractor is **City Park Garage Inc.,** a joint venture of Ford J. Twaits Co., T. S. Construction Engineers Inc., and Morris-Knudsen Co. Inc., Los Angeles.

Colorado

Patterson Foundry & Machine Co., East Liverpool, O., opened a district sales office in Denver, in charge of Robert Alldredge and William Horblit. The company specializes in grinding, blending, mixing and processing equipment.

Delaware

Hercules Powder Co., Wilmington, Del., completed construction of a three-story addition to its main laboratory building at its experiment station near that city. The addition increases research facilities of the main building by more than 60 per cent.

Delaware

National Tool Corp.—tools—was chartered by the secretary of state's office, Dover, Del. Capital of the firm is listed at $1,250,000. U. S. Corporation Co., Dover, Del., is serving as the principal office.

Delaware

Liston Corp.—machinery—filed a charter of incorporation with the secretary of state's office, Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Illinois

Thor Corp., Chicago—home appliances—is converting the foundry area of its plant in Bloomington, Ill., into general manufacturing space. The added facilities will be made available for military production.

Illinois

International Register Co., Chicago, awarded the general contract for a $1.1 million factory to be built in Niles, Ill., to City Wide Builders, Chicago.

Illinois

Acme Steel Co., Chicago, contemplates construction soon of a $1.5 million addition to its Riverdale, Ill., plant.

Illinois

Allen Industries Inc., Detroit, will build a $1.2 million plant in Herring, Ill., for the manufacture of rubber floor mats, seat cushions, seat covers, etc., for automobiles.

Kansas

Independent Plow Co., Neodesha, Kans., will award contracts soon for the erection of a $300,000 factory building.

Louisiana

Hilliard Corp., Elmira, N. Y., appointed Betz Engineering Sales Co., New Orleans, as its representative to handle the company's lubricating filters, reclaimers and purifiers.

Maryland

Blair W. Rairigh, who operates a machine shop at 4001 Falls Rd., Baltimore, awarded a contract for the erection of a plant at 1503 W. 41st St., that city.

Maryland

Harry C. Weiskittel Co. Inc., Baltimore—gray iron castings, cast iron soil pipe and fittings, gas ranges, cookers,

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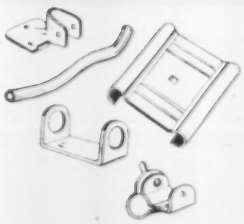

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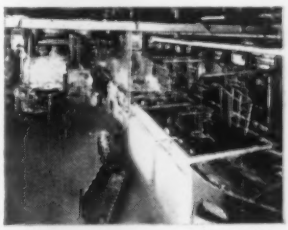

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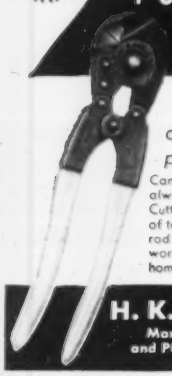

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Michigan

H. E. Dickerman Mfg. Co., Springfield, Mass., appointed Gullberg Die Supply Co., Detroit, as its representative in that area. Dickerman manufactures automatic punch press feeds.

Missouri

Walsh Refractories Inc., St. Louis, is erecting a building to house a large tunnel kiln and dryer at its fire brick manufacturing plant in Vandalia, Mo. A new press and additional grinding equipment will be installed in an adjacent building. Estimated cost of the program is $400,000.

New Jersey

Barnett Foundry & Machine Co., Irvington, N. J., acquired a foundry in Dover, N. J. This plant will provide extra capacity to meet increased demands for Meehanite castings.

New York

Twin Coach Co.'s Aircraft Division, Buffalo, launched an expansion program which includes construction of a plant addition, leasing of added manufacturing space at Buffalo airport and revamping of production equipment.

New York

Donner-Hanna Coke Corp., Buffalo, is spending $2.3 million for modernization and expansion of its plant facilities.

New York

Rochester Can Co. Inc., Rochester, N. Y., was sold to a group headed by Julius LaRaus of Westport, Conn. A program of modernization and expansion will be launched at the plant, with special equipment installed to handle defense work.

New York

Kalex Corp., New York, is now exclusive distributor in this country for Cary of Switzerland, makers of precision gages.

Ohio

Serrick Corp., Defiance, O., purchased the physical assets of Steel Cooperage Co., Detroit. Serrick operates the John Lees Division and the Acme Machine Products Division at Muncie, Ind., and the Defiance Screw Machine Products Co., Defiance. The Detroit plant will continue to make containers and stainless steel stampings for the automotive and household appliance industries.

Ohio

Columbia Steel & Metals Inc., Cleveland, applied for a permit to build a $500,000 scrap processing yard in Girard, O., near Youngstown.

Pennsylvania

Firth Sterling Steel & Carbide Corp. will move its general offices, research department and pilot plant from McKeesport, Pa., to 3113-15 Forbes St., Pittsburgh 13, about Apr. 1. Production facilities at McKeesport will be expanded.

Pennsylvania

American Engineering Co., Philadelphia, appointed Compressed Air Products, Brooklyn, N. Y., as its representative for two of its products—Hele Shaw and Hydramite pumps—in New Jersey, New York and the New England states.

Pennsylvania

Kennametal Inc., Latrobe, Pa., opened a district office in the Metropolitan building, Minneapolis, in charge of Harry Brandvik. It also appointed W. J. Collins as representative in New England and Frank Price as service engineer in the middle Atlantic district.

Pennsylvania

Trion Inc., McKees Rocks, Pa., is in the process of an extensive expansion program. The company makes filtering equipment for cleaning and purifying of air and other gases.

Texas

Lord Mfg. Co., Erie, Pa., opened a field office in Dallas. The company makes vibration rubber mountings, bonded rubber products and flexible couplings.

Wisconsin

Globe-Union Inc., Milwaukee, is expanding its operations by leasing 65,000 square feet of manufacturing space in a building at 424 N. Fourth St., that city.

Canada

Ford Motor Co. of Canada Ltd., Windsor, Ont., plans to build a parts and accessories warehouse in Regina, Sask. Cost is estimated in excess of $1 million.

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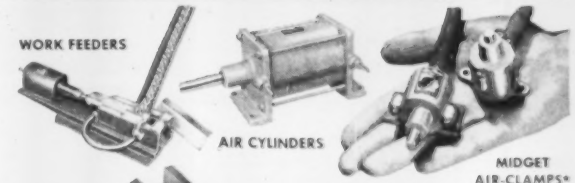

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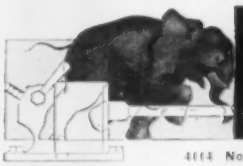

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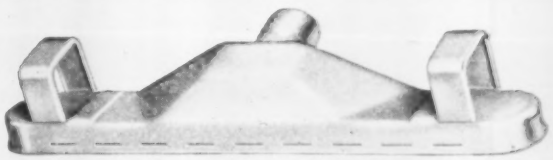

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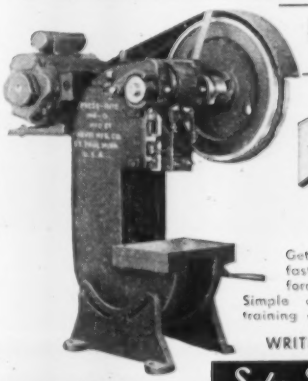

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